# The Technology Review

Volume IV. October, 1902 Number 4

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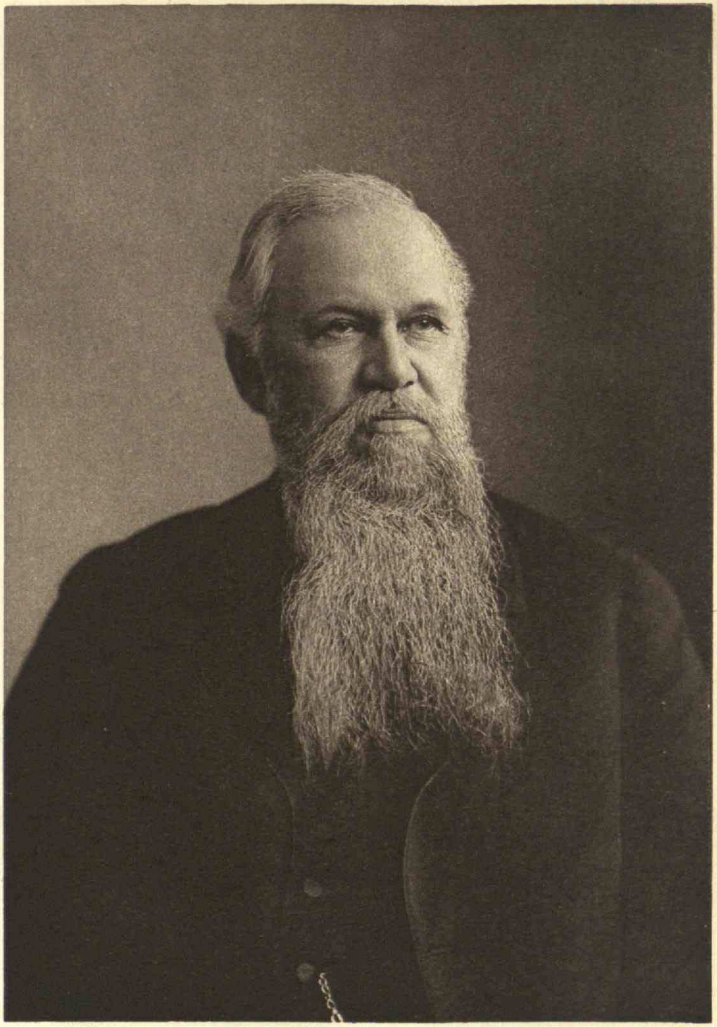
technology
review
Published by MIT

*THE TECHNOLOGY REVIEW is published four times a year: during January, April, July, and October. The annual subscription is one dollar; single copies, thirty-five cents each. Communications should be addressed to THE TECHNOLOGY REVIEW, 83 Newbury Street, Boston, Mass.*



The Technology Review

Vol. IV. OCTOBER, 1902 No. 4

# WILLIAM HARMON NILES

*S.B. Harvard 1866; Ph.B. Yale 1867; A.M. Wesleyan 1870. Professor of Physical Geology and Geography, 1871–1878; Professor of Geology and Geography, 1878–1902; Professor Emeritus of Geology, 1902.*

He was born at Northampton, Mass.; but, when less than four years of age, his parents moved to Worthington, Mass., where he received his early education in a district school. His father, Rev. Asa Niles, had a remarkably retentive memory; and his mother, Mary A. (Marcy) Niles, was gifted in the use of the English language and was fond of nature. His inherited traits of mind were manifested very early. In boyhood he was fond of collecting minerals and plants in the region of his home, and his subsequent career was foreshadowed by his youthful recreations. At the age of sixteen he had a good collection of the minerals of Worthington and of four neighboring towns, which he had gathered, arranged, and labelled.

He began teaching in Worthington at the age of seventeen, and taught there four consecutive winters, and next at North Blanford two terms, followed by one at North Becket. During the summer seasons he worked regularly upon his father's farm. It was not until he was twenty that he received his first school instruction in any science.

At that time he went to the Wesleyan Academy at Wilbraham, Mass.; but he could not remain for consecutive terms, as he was obliged to support himself by his own earnings. There he received instruction and encouragement from his uncle, the late Oliver Marcy, LL.D., of Northwestern University, at Evanston, Ill.

It was with Dr. Marcy's advice that he went to Cambridge to become a pupil of the distinguished Professor Louis Agassiz. At the Museum of Comparative Zoölogy his work was largely zoölogical, but geological studies were favorites. It was while there that he developed a decided fondness for physical geography. As a student of the Lawrence Scientific School, he attended two courses of lectures in Comparative Anatomy by Professor Jeffries Wyman, three courses in Botany by Professor Asa Gray, a course by Professor Lovering, and he took two courses in Mineralogy under Professor Josiah P. Cook. His special studies under Professor Agassiz were of the nature of investigations, often without any aid from books. In this way he carefully studied modern corals, and fossil lamellibranch mollusks of the Mesozoic. His most extended and detailed researches were upon the Crinoids, and it was upon the classification and geological distribution of this group that his thesis was prepared. He spent six months in Iowa and Illinois studying the noted Crinoid collections of Charles Wachsmuth, Dr. Thieme, and Rev. W. H. Barrus, and in making various field studies in geology. As agent for Professor Agassiz, he purchased the last-named collection for the Museum at Cambridge. It was through the highly esteemed kindness of Professor Agassiz and the assistance which he granted him from the Thayer Fund that he was enabled to enjoy such opportunities for four years.

He was a room-mate, and for many years a close friend,

of J. A. Allen, now curator of the Department of Mammalogy and Ornithology, at the Museum of Natural History, Central Park, New York City. Other students at the Cambridge Museum with whom he was intimately associated were A. Hyatt, C. F. Hartt, A. E. Verrill, F. W. Putnam, S. H. Scudder, A. S. Packard, Horace Mann, A. S. Bickmore, and O. H. St. John.

Largely by the friendly assistance of Professor A. E. Verrill he was enabled to spend a year and a half as a student in the Sheffield Scientific School at New Haven, from which he was graduated Ph.B. in 1867. He was a working student in Professor Verrill's laboratory. He had mineralogy with Professor G. J. Brush, French and German with Professor W. D. Whitney, lectures in physical geography by Professor Daniel C. Gilman, and in geology by Professor James D. Dana and Professor O. C. Marsh. His most intimate student associates were Sidney I. Smith and William North Rice.

He received the degree of A.M. from Wesleyan University in 1870.

In addition to these preparatory studies and labors, Professor Niles was further qualified for giving instruction at the Institute by his experience as a teacher and lecturer. He taught in several private schools, and was thus associated with the Gannett Institute for several years. Before leaving Cambridge, he had been appointed instructor and lecturer in natural science at the State Teachers' Institutes of Massachusetts. His services in this position were distributed through a period of ten years, lecturing in every portion of the State. When he was invited to teach at the Institute of Technology, he had become widely and popularly known as a lecturer upon geological and geographical subjects. Under the advice and counsel of Professor Will-

iam B. Rogers he was appointed Professor of Physical Geology and Geography in 1871. For eight years his instruction at the Institute was given during the second half of each year, thereby affording him the opportunity of continuing his public lectures.

Feeling that a personal acquaintance with various countries was essential to a teacher of Physical Geology, Professor Niles made journeys to Europe, spending portions of three summers among the Alps. There he visited and studied for himself the districts which had been made famous by the studies of his former teacher, Professor Louis Agassiz, and by the investigations of others. His own observations while there led to the publication of papers upon the "Agency of Glaciers in the Excavation of Valleys and Lake-basins," upon the "Relative Agency of the Glacial and Subglacial Streams in the Erosion of Valleys," and upon the "Occurrence of Zones of Different Physical Features upon the Slopes of Mountains."

He twice visited Holland, that he might observe the peculiar relations there existing between physical features, geological changes, and human life. His observations in that country were very useful in his geographical teaching at the Institute. His illustrated lectures upon "Holland and its People" and upon his experiences among the Alps were so well received and so widely delivered that they yielded an important part of his resources for travel and extended geographical study.

He also gave courses upon scientific subjects before public audiences. Three courses of twelve lectures each were delivered at the Lowell Institute in Boston, "Geological History, Ancient and Modern," "The Atmosphere and its Phenomena," and "Physical Geography of the Land" being the respective titles. Courses were also given by him in

Boston for the Society of Natural History, the Teachers' School of Science, and the Appalachian Mountain Club. He gave two courses at the Peabody Institute in Baltimore, and similar courses at Wakefield, Jamaica Plain, Charlestown, and Framingham. The success of his lectures was such that he was sometimes called to speak from fifty to one hundred times in a single season.

He became interested in the evidences that portions of the rocky crust of the earth usually regarded as stable were really affected by an energy sufficient sometimes to fracture and somewhat dislocate them. As a result the following papers of his were published: "Peculiar Phenomena Observed in Quarrying"; "Effect of Pressure on Rocks"; "Further Notice of Rock-movements at Monson, Mass."; "On Some Expansions, Movements, and Fractures of Rocks Observed at Monson, Mass."; and "The Geological Agency of Lateral Pressure Exhibited by Certain Movements of Rocks."

In 1878, when Dr. T. Sterry Hunt retired from the chair of geology, W. H. Niles was appointed Professor of Geology and Geography and W. O. Crosby assistant in Geology. At that time there were no arranged collections, and very few appliances for instruction in that branch. The building up of the present collections has been a work of thirty years. They now represent Structural Geology, Mineralogy, Lithology, Economic Geology, and Palæontology; and they contain thirty thousand specimens which are well arranged, mostly labelled and to a considerable extent catalogued. Great credit is due to Professor Crosby for what he has done in this arduous work. Professor Niles has also been a large contributor, particularly in Palæontology; and he has been steadily active in the formation of the admirable collections which the Institute now possesses. Vis-

itors from other institutions have spoken in terms of high commendation of the adaptation of these collections to the eminently practical instruction given at the Institute.

In response to an official inquiry for the right man to be made president of the Institute, it was Professor Niles who first suggested Francis A. Walker. The reply was that there was no probability that he could be obtained. Professor Niles then requested and obtained permission to inform General Walker of this mention of his name, and went of his own accord to New Haven, the more thoroughly to remove the doubt. General Walker first expressed his surprise, and later replied that he highly esteemed the Institute, and that there was no city he would prefer to Boston as a place of residence. It was this reply obtained and brought to Hon. John Cummings by Professor Niles that opened the way by which the Institute secured President Walker.

Professor Niles has held positions of honor and importance in other connections. He was for five years the president of the Boston Society of Natural History, was three times elected president of the Appalachian Mountain Club, was the president of the New England Meteorological Society, and is now the president of the Lawrence Scientific School Alumni Association. He has been Professor of Geology in the College of Liberal Arts of Boston University from its first class to graduate to the past year. He is still the head of the Department of Geology at Wellesley College where he has been professor for fourteen years.

He is a fellow of the American Academy of Arts and Sciences, fellow of the Geological Society of America, member of the National Geographic Society, corresponding member of the New York Academy of Sciences, etc.

Since his connection with the Institute, Professor Niles has been sought several times for other institutions. He has a letter from the distinguished geographer, the late Professor Arnold Guyot, asking him if he would come to Princeton with the prospect of taking his position when he resigned.

The writer of this sketch first met Professor Niles in 1878, when he was under his instruction at the Massachusetts Institute of Technology. The professor impressed him from the beginning of his acquaintance as a teacher who was specially cordial and helpful to his pupils. He was a most interesting instructor; but, more than this, he was the personal friend of his students. By the logical way in which he developed his subject he made it extremely clear to his hearers, while his own warm interest in what he was teaching gave a peculiar fascination to his lectures, and increased and deepened the love of science which his pupils already possessed. In this way his classes came to think of him as their friend as well as a most valued instructor. He had the rare faculty of inciting his pupils to orderly behavior in the class-room without resorting to any of the devices of the stern disciplinarian.

A former student and present colleague of Professor Niles says: —

Professor Niles was one of the most inspiring teachers under whom I have ever studied. As a lecturer, I have seen few men that I have considered his equal. He not only interested his students in his subject, but inspired them to think and investigate for themselves. I think I did more outside reading in connection with Professor Niles's courses than in connection with any other courses I had at the Institute, and the interest in the subject which he aroused in me was deep and lasting. Professor Niles's

attitude towards his students was such a judicious mixture of firmness and kindness that there was never need for any exercise of discipline or any disposition on the part of the students to play any of the boyish pranks which they sometimes practised with other teachers.

As a colleague, my respect and admiration for Professor Niles have only increased as time has passed. I look upon him, not only as one of the men from whom I have derived the greatest inspiration and assistance during my school-days, but whose friendship has been a continued source of satisfaction and enjoyment.

During the long period of his connection with the Institute, Professor Niles has been an influential working member of the Faculty, and has been very frequently called by his colleagues to act as chairman at their meetings. As the head of the Department of Geology, and as a member of the Faculty, with his services upon various committees, his labors have often been as arduous and as exacting as those arising from his class work. For a number of years he was chairman of the Committee on Graduation Exercises, and he has been a member of the Standing Committee on Scholarships from the time it was established to the present. To these statements it should be added that the whole-hearted devotion which Professor Niles gave to his routine labors as an instructor in the Institute left him but little strength or time for outside work or for original research in the sciences of which he was so successful a teacher. His chief reason for retiring at this time from his thirty-one years of active service at the Institute is his desire for an opportunity to discuss certain educational and scientific topics before a wider public. He still retains health and vigor and remains at the desk he has occupied, thus continuing his presence at the Institute.

GEORGE H. BARTON, '80.

## THE SERVICE OF SCIENCE TO THE UNIVERSITY, AND THE RESPONSE OF THE UNIVERSITY TO THAT SERVICE.*

The present age has been called, and rightly so, the Scientific Age. At no other period of the world's history has science played so great a rôle in human life. She has come into modern civilization not only as the cheerful maid-of-all-work, to light and cleanse and beautify the path of humanity, but she has found her way into the very sanctuary of the individual human soul, to affect profoundly man's views of history and of philosophy and of the significance of life itself.

To say that the university has shared in this general service of science to all institutions and to all civilized men is to state only a part of the truth. The university of to-day — such an institution as that in which we now foregather — is fundamentally different in spirit and in method from the mediæval institution which bore that name, or even from the university of a century ago. That difference is due absolutely to the growth of what is called the scientific spirit, and to the adoption of what is called the scientific method. A statement of the service of science to the university is, therefore, largely contained in the definition of what science itself is.

What is the scientific method? And who are scientific men? How does the scientific method differ from other methods, and what criterion may be applied by which it may be decided whether a man be truly a scientific man or not?

The answer to these questions is not easy. It is less difficult to say what the scientific method is not than to indicate in a few words what it is. But some appreciation of its meaning lies at the beginning of any attempt to understand the work of men of science or of any attempt to

* Delivered on the occasion of the Forty-second Quarterly Convocation of the University of Chicago, June 17, 1902.

estimate the significance of the scientific research of the past forty years.

A very bright woman once said of Boston that it is not a place, but a state of mind; and something similar to this may be said of the scientific method. It is not a method of observation; it is not a special sharpness of vision; it is not the ability to study with tireless patience the phenomena of nature; it is not the habit of bringing together all the facts before making a deduction; it is not even the devoted pursuit of truth, although it includes all these. The essential quality of the scientific method lies rather in the attitude of mind of the student who uses it than in any form of observation or grouping of facts, or even in devotion to its truth as he sees it. That attitude can scarcely be described by a single word or a single phrase. It is perhaps best indicated by the words "open-mindedness" and "intellectual sincerity." In other words, he who seeks truth in the scientific spirit binds himself to no *a priori* theories, accepts as his guide no formulated creed, allows no halfway truth to divert his reasoning.

But he goes much farther. He follows the facts as fast as they are proven to be facts, whithersoever these facts may lead. He accepts them, no matter though they go directly against theory and directly against tradition. The scholarship of the university has always had, in greater or in less degree, the qualities of devotion and of energy. But the great service which science has rendered to it has been not simply in directing the scholarship of the university into new channels, and in the addition of scientific subjects to the university curriculum. The real service of science consists in the fact that it has given a new scope and a new spirit to all scholarship, no matter in what direction it may turn. It has brought to the university the conviction that the scientific method — that open-mindedness and intellectual sincerity — lies at the basis of all true scholarship; and to-day these are admitted as necessary conditions, whether the student work in physics or chemistry, in history or in economics, in literature or in theology. This is the distinctive characteristic of the scientific method, and in this lies the real service of science to the university.

I think it is very easy for us to undervalue the great meaning of these few words. It does not seem much when one says that the adoption of the scientific method means open-mindedness and intellectual sincerity. For, after all, this scientific method is no new thing. This method of study, which includes the humbler virtues of patience and energy, and which finds its perfect development in sure thinking, in open-mindedness, in intellectual sincerity, is that which has been used in the past by all great men who have led mankind to clearer and higher views of truth and of justice. Socrates and Marcus Aurelius and Jesus the Christ have followed this way. And the glory of our day is not in the discovery of the way, but the opening of it to all the world. It is to this end that humanity has labored through centuries with groanings that cannot be uttered. For a thousand years the path of intellectual sincerity, which leads to spiritual freedom, was barred to all but the few; and these walked therein with fear and trembling. The very influences which might most naturally have helped to clear this path proved the severest obstacles; and the spiritual freedom which seemed so near after the first triumph of Christianity came only after centuries of disappointment and patient toil. But it came, and the nineteenth century of our era passed into history illuminated by an immortal glory,— the glory of individual freedom of the mind for all men.

It is into this larger freedom that science has led the university; and the debt which the university owes to science and the scientific method is no mere debt for material gains, no obligation which can be paid by dollars and cents, by halls and laboratories. The gift of science to the modern university is the priceless gift of a new scholarship,— a scholarship which can be satisfied by nothing less than spiritual freedom, and which can grow in no other atmosphere.

To this service there is one response, and one only, that the university can make which is adequate; and that is made when the university maintains about it an atmosphere in which the truest scholarship will flourish, when the uni-

versity lends itself to the life of intellectual sincerity, when the university is the home of spiritual freedom, and, therefore, the home of the true scientific spirit. And the question which science and which scientific men of America to-day ask of the American university is this: Will the university repay to science the debt it owes? Will it be the home and nursery of the science of the future? Will there come from its doors men inspired by the scientific spirit who may by their service make still plainer the way of truth in which all men may walk?

"The chief duty of a nation," writes Lowell, "is to produce great men; for without them its history is but the annals of ants and bees." There is a great truth contained in this observation; for, if a nation give not great men to great causes, that nation either lacks the fibre out of which great men are made or else the cause itself has not appealed to those capable of responding to it. Whether a nation fail to produce great men by inherent weakness or whether it fail to produce them because the atmosphere to grow great men is wanting, the result is apt in the long run to be the same. Such a nation becomes satisfied with mediocre things. It loses the inspiration of high endeavor. It is content with those things which are transient and material rather than with those things which are true and are eternal. For it is ever true, as Martineau has written: "The best of all a man's work is to show us what he is. The noblest workers of our world bequeath us nothing so great as the image of themselves." It is computed that the discoveries of Pasteur in a single decade were worth in money more to France than the value of the indemnity paid to Germany. But the greatest service which Pasteur rendered his country was the gift of himself. Nor is the growing of great men by any means the result alone of individual influence and example, however potent these may be. The institutions of a country determine in large measure the directions of national greatness, and the maxima to which national greatness may attain. There is a sort of reciprocal relation between the great men and the great institutions of a country. Montesquieu has expressed the

truth, at least in part, when he says, "In the infancy of societies, chiefs of the state form the institutions: afterwards the institutions form the chiefs of the state." Who are the chiefs of the state? Are great scholars of science and literature,— and, as Huxley was wont to say, these are not separate things, but two parts of the same things,— are the great scholars to be counted as chiefs of the state along with statesmen and warriors and financiers? If they are, have we an institutional life favorable to their growth?

The American who reads the story of scientific progress for the century just closed, if he be interested in science as a part of a great patriotic movement, will note some facts not altogether pleasing to national complacency.

He will, first of all, observe that the Americans whose names are remembered in a world's record of scientific achievement are few. The American whose name one finds on this roll of honor is usually one who — like Bell or Edison or Thomson — has made splendid applications of science rather than he who has discovered great principles. He has come, as a rule, not from the American college or university. His scientific career can seldom be traced to some great teacher, nor has he, with rare exception, transmitted his own enthusiasm to a group of students

> "Who to the sage devoted from their youth,
> Imbibed from him the sacred love of truth,
> The keen research, the exercise of mind,
> And that best art, the art to know mankind."

And nowhere in the record stands the name of a great master, one who might rank with Helmholtz or Darwin or Pasteur.

May we hope for such in the twentieth century, and will they come from the American university?

I apprehend that to this question only the future can vouchsafe reply. No man will undertake to predict what the growth of the future may bring forth. I ask your attention, therefore, to what seems to me a more practical exercise; namely, a brief statement of the constitution of

the American university as it has come to exist within the last decade, the organization which it has assumed, and, finally, to point out certain conditions which seem to me necessary, if it is to be the home of the highest scholarship, if it is to send out great names in science, if it is to repay to science the debt it owes.

Professor Ladd wrote fifteen years ago in his little book on higher education, "Although there may be universities in America, no one can tell what an American university is." The words in more than one sense are true to-day. The title "university" is borne by some hundreds of institutions in America to-day. With the exception of perhaps a score, it is no more an index of the work which the institution is conducting than the title of colonel is in Kentucky an index of the occupation of the gentleman who bears it. In most cases it has been assumed, in the spirit of Paul's definition of faith, as "the substance of things hoped for," and too often "as the evidence of things not seen."

One cannot but regret, from the standpoint of historic scholarship, the misuse in our country of the name "university," and the haste with which our colleges have assumed it. However characteristic of American custom it may be to covet the larger title, it is surely no gain for true scholarship,—and true scholarship is the scholarship of truth,—it is no gain for true scholarship when an old and great college elects to become a weak university.

Notwithstanding all this, however, and admitting frankly that we have to-day in the United States no university in the exact sense in which that term is used on the continent of Europe, an institution has arisen within the last two decades distinctly American, growing out of the American college, which has a real university purpose and aim, and which in its outward organization seems likely to furnish the type of institution to be known as the American university.

The beginning of this new American university dates from the founding of the Johns Hopkins University a quarter of a century ago. The founder of this institution

had no particular sympathy with the university idea and no plan with respect to the founding of one. The administration of his gift fell fortunately into the hands of a man in touch with the scholarship of the world. The time was ripe for a school devoted to literary and scientific research. American students had been attending in increasing numbers the universities of Europe. Many of them had come home inspired with the intellectual atmosphere of the German seminar. The note of scholarship was beginning to make itself heard. The establishment in Baltimore of a university whose chief aim was research met instant and hearty recognition. Its success quickly bore fruit in the establishment of graduate schools in other universities and colleges and in the quickening of graduate schools already in existence. The establishment in 1892, on broad and generous lines, of the University of Chicago, gave fresh impetus to the current setting toward university effort.

Meantime another educational movement had come in to modify its organization and to influence its spirit. Cornell and the great State universities of the West began their work without traditions in favor of one or another branch of learning. The study of the classics and the study of applied sciences were admitted as equally worthy of university cultivation. The scientific school assumed in these institutions, in response to the popular demand, the form of a technical school similar to the *polytechnicum* of Germany and to the technical schools founded after its pattern in this country.

The scientific schools of the older Eastern colleges, which had at their inception looked rather toward the cultivation of pure science, soon felt the influence, perhaps the competition, of this movement; and their schools of science — such as those of Harvard, Yale, and Columbia — have taken on more of the character of technical schools than schools of pure science.

The practical resultant of these two movements is the American university as we know it to-day,— a graduate school, but resting upon the college and the scientific school. It admits to its lectures and to its laboratories the

graduates of each, and offers the doctor's degree upon terms quite similar to those upon which the degree is sought in continental universities. How rapidly the graduate school has developed is in part indicated by the mere statement of its numerical growth. When Johns Hopkins University opened its doors in 1876, there were about four hundred graduate students in all the colleges and universities of the United States. To-day students in the graduate schools number six thousand.

The American university as thus constituted — a conglomerate institution, including college and technical school and crowned by the graduate school — differs from the college in the place which it gives to independent individual scholarship, to the scholarship of research. Whatever the college or the scientific school may stand for, the graduate school stands for scholarship, its aim is the promotion of the spirit of research. It is in response to the demand for such opportunity for research that the graduate school has arisen out of the college and the scientific school.

Of all national efforts to promote the spirit of research the German universities are perhaps the most successful. Our graduate school bears a closer relation to these than to any other university effort. The American college is the historic background of the graduate school. The German university has back of it a history which is a part of the nation's history. What are the underlying national movements which have developed these two characteristic efforts at higher education? — for institutions of learning, like all other institutions, grow out of the life of the nation in which they rise.

All systems of education, whether in Germany, America, England, or China, undertake to train men for citizenship. In the introduction to that impressive collection of volumes given forth at the recent celebration of the founding of Yale College, President Hadley gives forcible expression to the idea in these words: "The real test of an educational system lies in its training of the citizen to meet political exigencies. If it accomplishes this result it is fundamentally good, whatever else it may leave undone.

If it fails at this cardinal point, no amount of excellence in other directions can save it." The educational system of Germany and that of the United States alike undertake to train men for citizenship. In Germany the ideal toward which the citizen is led is intellectual freedom, and the university is the concrete expression of that ideal. The ideal of individual freedom toward which America looks is political independence. The American college is the national response to this ideal.

The history of the influences under whose action the German people came to accept as their ideal intellectual rather than political freedom is the story of the German people itself. A powerful influence in this direction came in with the Reformation and the moral and spiritual quickening which followed it. The German states, with Prussia in the lead, have been constantly hemmed in by powerful neighbors. A strong centralized government has been almost a necessary condition for existence. The efforts to establish a democratic form of government have been fitful and unsuccessful. But with unfailing devotion the Germans have struggled for intellectual and moral freedom. It is not easy for us, as Americans, to understand that a people can struggle more earnestly for spiritual freedom than for political liberty. But this is the historic contribution of the German people to the progress of the race. The American declaration of independence declares all men (politically) equal. The constitution of the new German Empire proclaims the freedom of the scholar in the splendid words, "Die Wissenschaft und ihre Lehre sind frei"; and by that freedom the German people stand watch and guard. Nor king nor emperor is strong enough to lay hands upon it.

During the last two hundred years the people of the United States have developed under very different conditions. The war with England intensified the passion for political independence, already strong in American hearts. Since that time the conquering of a new continent, the experience of civil war, the relations with other countries, have deepened the sentiment and strengthened the na-

tional ideal. The American college, developed under these influences, represents, no less truly than the German university, a dominant national sentiment. It has trained men in ever-widening directions for American citizenship. It no longer stands as the entrance to the learned professions only. Its dominant note is not one of scholarship. From its doorway a multitude of paths diverge into all the activities of a varied citizenship. It is to-day the American conception of a preparation for citizenship in a free state, whose ideal is political freedom. It has served its purpose well. To regret that it is not the German university is to regret that Germany is not America.

Nevertheless, it is well to recognize frankly that the German university stands for an ideal which America and American institutions cannot disregard. Political freedom is a splendid thing, but it is not so splendid as spiritual freedom. If the American college stands for the training for a citizenship whose ideal is political liberty, the American university must stand for a citizenship whose ideal is spiritual freedom. It is for this purpose that the graduate school has grown out of the college. If this growth is the expression of a true national movement, there stands back of it a higher interpretation of the meaning of American citizenship. If it be a response to a national sentiment, it marks a later stage in the development of national character.

Notwithstanding the establishment of the graduate school, the dividing line between those institutions which are fairly considered universities and those which are colleges is still very uncertain, and some difficult questions of a practical sort need to be solved. We surely do not need as many universities as we have institutions which now bear that title. Shall some of them drop the name, and assume one that more distinctly indicates their work? This were a consummation devoutly to be wished, but as yet realized in only one instance, magnificent in its isolation.

Shall the colleges which remain colleges attempt work of research, or shall that be considered distinctly a function of the university? May the schools of technology, which at least have the merit of really carrying on the work which

their name implies, have a relation to the university? If there were a chemical affinity between institutions of learning, the technical schools and the colleges might unite to form universities, just as oxygen and hydrogen unite to form water. This, also, must wait a larger development of altruism. One other union only is more difficult to effect than that of two educational enterprises: that is the union of two church organizations of the same faith.

Shall the schools of technology, on the other hand, establish departments of research and develop into universities of applied science, and, following the lead of the German technical schools, offer the degree of doctor of engineering?

The university itself presents in its undergraduate branches differences of educational practice as great as those which exist between the institutions themselves. In the college the student is trained for citizenship under a régime which allows an election either absolute or partial of the studies he pursues. In the engineering school of the university the student, also being trained for citizenship, is required to take an absolutely rigid programme of studies. The situation reminds one of the political status of the Australian colonies before the federation. Side by side grew up states — such as New South Wales and Victoria — both under the English flag, the one committed to the doctrine of thorough-going free trade, the other to a system of rigid protection. It is comforting to reflect that both prospered. After all, the training of the school is only part of the man's education, as the tariff is only one of the political conditions which affect the growth of a state.

The question whether the college and the technical school and the university can best serve the ends sought by each when separate rather than when merged into one complex organization, such as our modern American university, is one whose discussion is perhaps now academic. The experiment is already being tried. One can hope only for the best results, while at the same time striving to overcome the difficulties. Whatever the advantages, one cannot doubt the reality of such difficulties.

One of the arguments most frequently put forward in defence of the present organization of the American university is the plea that the graduate school will furnish inspiration and guidance to the undergraduate departments.

No doubt, this is in part true; but it is quite as important to remember that our universities are, for the most part, still great colleges with a relatively small graduate school at the top. And it is altogether likely that for a long time to come, as in the past, the great undergraduate stream of life and undergraduate interests will form the dominant influence in the university. And the American college, product as it is of American national life, reflects to-day no less the weakness than the strength of our national character. In no institution have the commercial tendencies of our national life been more strongly reflected than in our college-universities. The American university, as it has grown out of the undergraduate branches, has approximated more and more closely business organization. It advertises its facilities for study in the same way in which the better commercial houses advertise their wares (a collection of college advertising literature is a most amazing and entertaining exhibit); it operates through a publicity bureau to reach the daily press; it maintains a correspondence bureau with preparatory schools and an employment bureau for placing its graduates. One finds in the student life a reflection of the same commercial tendency. I do not refer to the increasing luxury and the increasing cost of college life,— a consequence sure to follow the increasing luxury of American home life. It is rather upon the intellectual and scholarly forces in the college life that these tendencies show greatest effect.

The scholarly influences in the college are, on the whole, relatively less, it seems to me, than in the college of fifty years ago.

> "The love of learning, the sequestered nooks,
> And all the sweet serenity of books,"

are still to be found, but are relatively less in evidence.

That which we call college spirit, that intangible some-

thing which gives color and direction to the influences of the college life, has no touch of scholarship in it. It is intensely local, and differs in no essential respect from the feeling which the boy entertains toward his preparatory school. It has no contact with the universal company of scholars. It is almost wholly a product of the student effort without association or co-operation from their instructors.

Perhaps partly for this reason it has taken the form of an intense athleticism, which has grown out of all perspective, and which has been permitted to obscure scholarship.

I believe in a brave and wholesome college spirit, one that shall include a real affection for the intellectual home of the college youth. But that spirit should at least have some touch with the scholar's life. It should help in some measure to bring the student into the goodly fellowship of books and of scholars. It should reflect the life and influence of the teacher as well as of the student.

I believe also in a wholesome athletic life and in a manly form of athletic contest. But the athletic spirit should be a part of the college spirit, not dominate it. Furthermore, it should be separated absolutely from the professional and commercial side. Professional coaches and gate receipts ought to have no part in the sports of students; and the elimination of these would very quickly help to restore to a modest and proper scale college sports, and to leave them games rather than occupations. And in the intercollegiate athletic contests graduate students should not enter.

All the influences, both those to which I have alluded and others which lead away from scholarship, are also those which tend to develop the college side of the composite American university rather than the research side.

For a long time to come even our strongest universities are likely to remain in effect great colleges, with a relatively small graduate school at the top. And, if they are to become universities in the real sense, it would seem to be necessary to strengthen scholarly influences in the college upon which the graduate school is grafted. To attempt to cultivate the highest scholarship in the graduate school

without quickening that spirit in the college is like trying to increase the fruitfulness of a tree by treating its branches instead of furnishing nourishment to its roots.

Amid the commercial tendencies of our national life it is worth while to remind ourselves continuously that the American university is not a business institution; and, that however important to its well-being certain business considerations are, no amount of business ability, no excellence of administration, no endowment, however generous, can take the place of a noble scholarship nourished in an atmosphere of intellectual freedom.

And, finally, if our American university is to be the nursery of great men of science, it must arouse a national appreciation of scholarship as a part of citizenship. Patriotism, as it is conceived in our country, takes the form of military or political service. The idea of serving one's country by devotion to science or letters, of adding to her fame and her glory by service in chemistry or biology or in literature, is practically an unknown motive among American youth. Yet it is one of the forms of patriotism most common in Germany and in France.

Last year an American firm sought to bring to its factories an expert from a well-known German university. The representative of the firm who visited the professor in his vacation found him absorbed in the effort to elucidate a principle of vital importance in his research. He refused all overtures to leave his work. As a last argument, the American urged that self-preservation demanded a change. He pointed out that ten years more of such intense study meant death. But the German brushed the suggestion aside with the words: "Oh, what matters it? If by running the machine at double speed I accomplish in ten years what I might otherwise do in twenty, the Fatherland is by ten years the better off. For me it matters not, if I serve her successfully."

Pasteur's scientific career was one inspired by a passionate patriotism,— a spirit which he received from his masters, and which he handed down to his own famous band of students. "Science," says he, "is of no country; but the

scientist must bear deep in mind all that may work toward the glory of his country. In every great scientist will be found a great patriot. The thought of adding to the greatness of his country sustains him in his long efforts, and throws him into the difficult and glorious scientific enterprises which bring about real and durable conquests."

The American is no whit behind the German or the Frenchman in devotion to that which appeals to him, but scholarship has as yet filled no part in his conception of patriotism. It remains for the graduate school, as the crowning member of our educational system, to connect patriotism and scholarship, and to open the door to a larger conception of citizenship.

On two panels of the gate which faced the water at your great Exposition of 1893 were these inscriptions,— on one side, "Civil Liberty the Means of Building up Personal and National Character"; on the other, "Toleration in Religion the Best Fruit of the Last Four Centuries."

Since that day has grown up in your midst the most enduring of all human institutions, a great university, and with it has grown a new conception of American citizenship. In the hope of the immortal life and the spiritual power of your university, whose growth is your growth and whose life is your life, let us add yet a third inscription on the archway by which your city is entered: "The University the Home of True Scholarship, the Door to the Highest Citizenship."

And now let me, in closing, say one word concerning another feature of the university organization. I have assumed in all that I have said concerning the university that, for the purposes of scholarship, the university is contained in that part of the organization under the Faculty of Arts and Sciences,— in German universities, the Philosophical Faculty. The schools of medicine and law, which in this country form parts of our universities, are not, with few exceptions, graduate schools. Even in these cases their purpose is to train men for the practice of particular professions, not for science or for letters. The Philosophical Faculty alone makes the work of scholarship its supreme

object. Whether or not the connection of the law school and the medical school with the university be desirable, it still remains that for the purposes of science the university is practically contained in the Philosophical Faculty.

With theology the case is quite otherwise. Theology is the name which men have given to the science of religion. If it be a real science, it has the same relation to religion which astronomy has to the stars or which botany has to the flowers. Its place in the university is the same as that which other sciences occupy, and not in a separate school. Approximately, some such position is taken by the science of theology in the Protestant universities of Germany. The labors of their scholars have borne precious fruit in the researches of the last fifty years.

Theology, which has most need for the company of the other sciences, has always been shyest of any intimacy with them. In this country it has only the slenderest contact with the university. The theological seminaries, which exist as separate schools, are not schools of theology in any scientific sense. They are training schools for fitting men for the ministry of a particular sect, practically denominational technical schools. However useful and however desirable they may be as fitting schools, it is most unfortunate that they should be the sole representatives of theology, and that theology should itself be divorced from other sciences. No better proof of this can be had than the meagre work of scholarship which theology shows in this country. A still more serious criticism is found in the fact that the theology taught in our seminaries is the theology of a hundred years ago. The Protestant Church in this country, which showed such marvellous adaptability to the conditions of life during the first half of the last century, has not kept equal touch with the conditions of later growth. It has lost contact, on the one hand, with a large part of our laboring population in cities, and has lost touch, on the other hand, with scientific men. This has not come about by any lack of interest in religion. It has not come entirely through lack of interest of scientific men. The result, so far as we see it to-day, is due in considerable

measure to the attitude toward scholarship of those who control the various branches of the Protestant Church. One of the causes of such estrangement is the isolation of theology. The university represents to-day the highest effort of the race, not alone toward intellectual achievement, but toward intellectual sincerity. Theology cannot grow, in any deep sense, apart from this common effort toward truth. On the other hand, if religion be the divine life in the individual human soul, the knowledge of that life has a significance beyond all other knowledge; and the science which deals with that life, with its history, its phenomena, and its laws, should surely find a home with other sciences in the true university. For a training school for preachers the university has no place, but for theology as a true science the ideal university has a need as real as that which the true theology has for the university.

During the past fifty years the faith of Christendom has seen old ramparts broken down and old creeds swept away; but through these scenes of doubt there has shone the glimmer of a larger faith, which grows brighter as religion joins hands with scholarship. For such a union there is no other place than a university which shelters the sincerest scholarship and which breathes the air of spiritual freedom. In such an atmosphere only will there be nurtured those who will lead humanity, it may be slowly and laboriously, it may be step by step, but who will lead, none the less surely, into that larger hope which Tennyson saw in faith when he sang: —

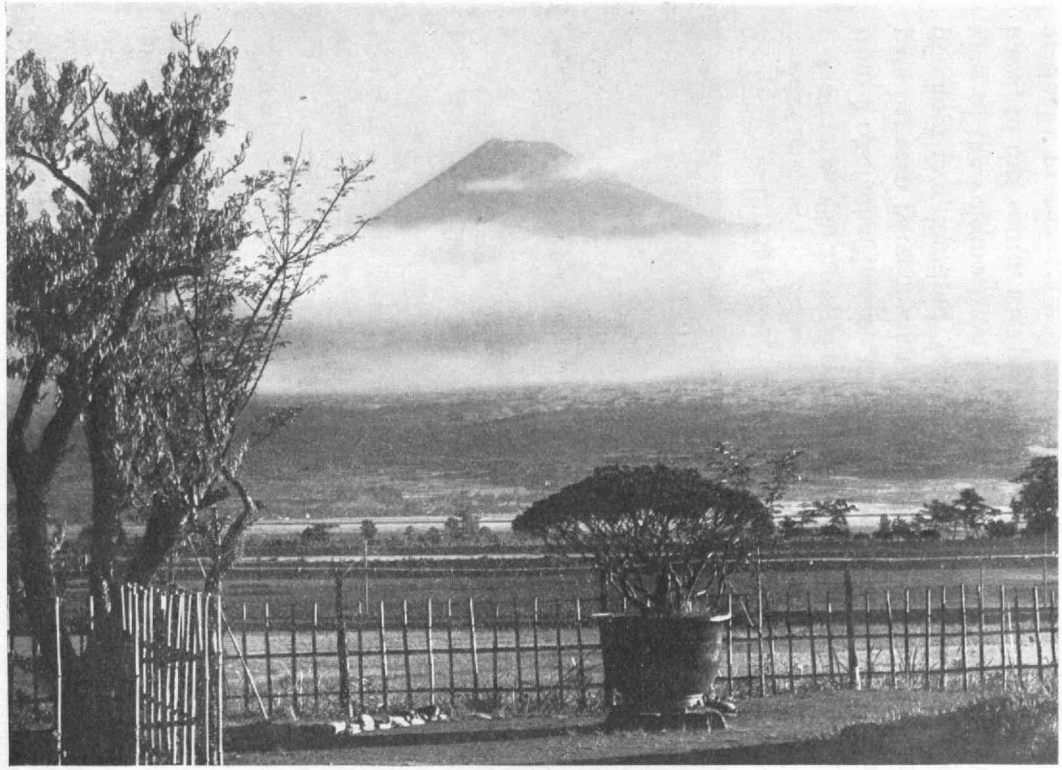
"I falter where I firmly trod,
And falling with my weight of cares
Upon the great world's altar-stairs
That slope through darkness up to God,

I stretch faint hands of faith, and grope,
And gather dust and chaff, and call
To what I feel is Lord of all,
And faintly trust the larger hope."

HENRY S. PRITCHETT.

## THE ASCENT OF FUJI BY THE INSTITUTE PARTY, AUGUST 2, 1901

We had been in Japan some six weeks, and still the first view of Fuji was in store for us. Most of our time had been spent in the southern part of the islands; but, the summer rainy season having passed, we were slowly working our way north towards Fuji. Mr. Kasahara, a Harvard graduate whom we had met some weeks previous at Tokyo, had promised to make the ascent of the mountain with our party. He was to join us at Gotemba on August 2. The last day of July we left Gifu, a small inland town where we had spent the evening watching the natives fishing with cormorants, and took the express north for the ride of some one hundred and sixty miles that lay between us and the place of meeting. About sunrise the following morning we got our first glimpse of the mountain. The train, for some time, had been climbing up through a narrow valley with the ever-present rice fields terraced back on the sides of the neighboring hills. Suddenly the valley turned, and there, directly ahead of us, stood the almost perfect cone of Fuji, still some fifty miles away, yet of so grand a scale that it seemed to tower to a tremendous height above the surrounding mountains. It was a beautiful morning without a cloud in the sky, and we could not have had a more perfect distant view of the mountain nor a more promising beginning for our trip. As we did not care to reach Gotemba until the following day, we spent the night at Suzukawa. We arose early the next morning, and were rewarded at sunrise by another view of the mountain at much closer range. From Suzukawa it is a short ride by rail to Gotemba, where we arrived on the afternoon of August 2.



Fuji at Sunrise, from Bessō Inn, Suzukawa

We were fortunate enough to secure comfortable quarters. Japanese accommodations were all that could be obtained, but throughout Japan these, as a rule, are much to be preferred to those in semi-European style; for they are always scrupulously clean, and one soon becomes accustomed to sleeping on the floor.

Fuji from the Gotemba Trail at Sunrise

Gotemba, which is about three hours' ride in the train from Yokohama, lies on the Fuji plain, at the base of the pass between Miyanoshita and the mountain, at an elevation of about five hundred feet, and enjoys an uninterrupted view of the volcano from base to summit. Towards Suzukawa, to the south, the plain from which Fuji rises slopes gradually to the sea. The town, originally the seat of a hunting lodge of some great Shogun, is now a small village of inns for the accommodation of pilgrims intending to make the ascent of the mountain. Its new part is near the

railroad station, and its one street is lined with inns. Fuji ranks as one of the sacred mountains of Japan; and thousands of pilgrims ascend it during the few summer months, to worship and purchase charms from the priests at the top. Although there are numerous ways by which the summit can be reached, the path on the Gotemba side seems to be the one most frequently taken by the pilgrims.

We also had chosen the ascent from Gotemba. Mr. Kasahara, with a friend, joined us in the evening. All arrangements had been completed; and we retired, expecting to make an early start at about two the next morning,— an expectation that was doomed to disappointment. We had overlooked the fact that to hurry a Japanese is impossible. The cause of the delay was our shoes, some of which had been sent out the night before to have leather strips nailed to the soles, that they might hold better in the loose cinders of the mountain. They should have been returned by midnight, but at 2 A.M. they had not arrived. One of our coolies was despatched to bring them. After waiting half an hour, it became necessary to send a second coolie to find the first, then a third to find the second, and so on until all our men were gone. It was not until our guide himself went that coolies and shoes appeared. The shoemaker, who lived a mile or so from our quarters, had gone to bed without finishing his task. He was roused and set to work by our men, who, instead of returning to tell us the cause of the delay, all waited for the job to be completed. Finally, about four o'clock everything was arranged to start.

We were fortunate in having with us one of the best coolies in the region,— a powerful fellow, who had a wide reputation for strength and endurance. A few years ago a Japanese meteorologist, Nonaka, and his wife attempted

to spend the winter on the summit of Fuji. A long period having elapsed without any communication being received from them, a relief party was formed to ascend the mountain. It was about Christmas, and the hardships of the undertaking may be imagined. Mr. and Mrs. Nonaka

Our Party at Uma-gaeshi

were found in such a condition that they had to be carried. The coolie with us was one of the relief party, and carried Mr. Nonaka on his back the entire distance down the mountain.

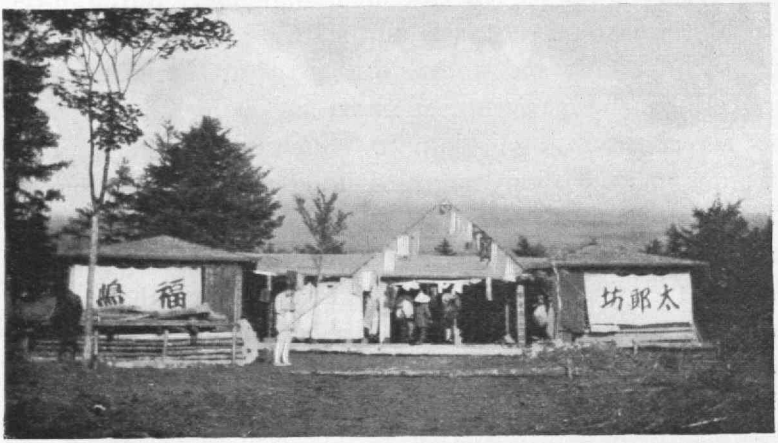
To make the ascent as comfortable as possible, we carried food and blankets. Rice and tea can be obtained at the huts on the way up, but nothing else. We had brought with us from Nagoya some canned goods; and

these, with such additions as could be procured at the inn, and our blankets, formed our outfit. There were seven in our party; and, to carry our provisions, blankets, water, and cameras, we needed six coolies, each of whom was able to take from twenty-five to thirty pounds on his back. The first part of the ascent was made on horses, so that with the seven horses, each led by a rather diminutive-looking woman or girl, and our six baggage-bearers, we formed a long procession as we left Gotemba, single file. But, unfortunately, we could not see our start, as it was made at 4 A.M. in a mist and a darkness so great that one could scarcely see the man who rode next ahead of him. It was not a very promising beginning. Each of us wore a piece of straw matting about two yards long and a yard wide tied about his shoulders as a cape, for protection against rain or sun, as the need might be. On our heads were large hats some fifteen inches in diameter, also of straw, and resembling sheaves of wheat as much as anything. For about two hours we marched at a snail's pace, in single file, over a slightly rising path, through rice fields or bamboo groves. The cultivation extends to an elevation of 1,500 feet. About daylight we were joined by the village master or mayor of a neighboring town, a friend of Mr. Kasahara, who had offered to accompany us. Sunrise found us well along on our journey. Our path now lay over a moorland, sloping towards the mountain, and covered with a coarse grass and a few shrubs. A few wild pinks, far sweeter than any of our cultivated varieties, grew along the path. The weather had cleared as sunrise approached, and the mist had gradually disappeared, until, when the first rays lighted the cone a brilliant red, only a few thin scattered clouds remained at the base of the mountain.

The ground now became steeper; and we found ourselves

at a small rest or tea-house, called Uma-gaeshi, at the edge of a narrow belt of timber which surrounds the mountain. Leaving this, the path grew very steep; and after a short climb we came to Tōrōbō, at an elevation of between 5,000 and 6,000 feet. We were joined here by the schoolmaster of an adjacent village.

Tōrōbō, so called from a goblin who is worshipped there, is about ten and three-quarters miles from Gotemba, and is




Tōrōbō

on the upper limit of the timber line on this side of the mountain. It is at Tōrōbō that staves to help the climber are procured. These have the name Fuji burnt into them, and one can have further inscription added by the priests at the summit for a few sen. A short stop was made here to rest the horses. We then pushed on. The Gotemba side of the mountain is divided into ten unequal parts or stations called "Go," beginning at Uma-gaeshi, Tōrōbō being between No. 1 and No. 2. At all of these, with the exception of No. 9, there are rough shelters where one can get rice or tea and, if necessary, spend the night. These shelters

are the rudest sort of structures, built of a few boards and stones, with the back and sides generally formed by digging into the mountain. The inside is no less rude than the out, so low that a European can hardly stand erect, and well blackened with smoke from the fire, for which there is no outlet save the door. A pile of snow on the roof supplies water, as it melts and drips through the smoky boards. After leaving Tōrōbō, about the only level ground on the mountain, except at the summit, is the small space in front of these huts.

From Tōrōbō we quickly passed above the timber line. A few straggling shrubs still remained, but these were soon left behind. Nothing could be seen but a black desert of cinders extending on all sides, until lost in the haze that surrounded us, unbroken save here and there, where a patch of white marked the position of a group of pilgrims, or where the shelters showed, mere specks on the black expanse. The sides of the mountain, sloping at an angle of thirty degrees or more, formed an unbroken straight line against the sky. The horses now commenced to zigzag their way up the mountain, to make the ascent less steep, ploughing through the loose cinders at every step. Station No. 2, the highest point to which one can ride, is at an elevation of 6,000 feet above the sea. We reached there about nine o'clock, and unpacked and ate our breakfast. A more or less prolonged stop was necessary, in order to rest the coolies; and it was nearly an hour later when we resumed our climb on foot. We had now before us a steady pull up hill, without even so much as a level spot or a firm path. Nothing broke the monotony of the black desert of cinders. Our way continued in a zigzag line up the steep slope, the only thing to distinguish it from the rest of the mountain side being its slightly harder surface

packed down by the thousands who had travelled over it. Although the vertical distance between consecutive stations is not more than 700 or 800 feet, one is not sorry to reach the shelters, and stand or sit on level ground for a few minutes' rest. A slightly overcast day prevented us from en-

Pilgrims resting at the Station

joying any extended view; but, on the other hand, it lessened somewhat the fatigue of our climb by moderating the intense heat that is radiated from the black cinders when the sun shines brightly. We found at the eighth station, at an elevation of 10,700 feet, a few small plants with yellow flowers. These were the last sign of vegetation. It was at this point also that we saw the first lava. A little snow was still left between the eighth station and the top. There is no hut at No. 9. The hardest part of the climb came between the eighth station and the tenth, which is at the summit. As the top was approached, the path became

very steep, and was over loose stones and broken lava, on which it was almost impossible to get a footing. The high altitude, combined with the steepness of the climb, was very fatiguing, and necessitated frequent halts to catch one's breath.

We finally reached the top about 6 P.M. It was not a record to be proud of, but we had not come to break records. In spite of our very leisurely ascent, we were in time to see the sunset; but it was disappointing, as a heavy bank of clouds and mist near the horizon prevented any color. Fortunately, there were no clouds on the summit; and, as darkness came on, a myriad of stars shone out, far brighter and clearer than is often seen except in high altitudes. Jupiter's moons were visible through a pair of Zeiss field glasses.

There are two groups of shelters on the summit, one on the Subashiri side, the other on the Gotemba. All of these are generally well filled with pilgrims, about 10,000 of whom, we were told, make the ascent each year; but in spite of this we managed to get accommodations, such as they were, in the Gotemba group, where we spent the night.

This group consists of three huts built about a small central area, which is thus more or less sheltered from the wind. The huts are almost as primitive as those on the mountain side, mere piles of stones with a roof of a few boards held in place by piling more stones on top. The floor, full of cracks, holes, and ridges, raised about a foot above the ground, is made of boards of various sizes, apparently laid any way to fill in the spaces between the none too regular supports. In a hut of this sort, so low that we could not stand erect, and with absolutely no ventilation save that afforded by the cracks and the door,— and even the door was tightly closed at night,— we made our quar-

ters. It was here that our party of seven, besides our coolies and a number of pilgrims, remained until morning. There must have been at least fifteen or twenty persons besides ourselves. We had a little more room allotted to us than the others. How they managed to pack themselves in more closely than we is a mystery; for we were packed in like sardines, so close that it was impossible to stretch

The Hut on the Summit where we Spent the Night

out at full length, and to turn over without disturbing one's neighbor was out of the question. "Futons," a sort of quilt, had been brought up from Gotemba for our beds; and with some of these on the floor, and others over us, we spent the night. Coverings of some sort were necessary, as the temperature fell below freezing before morning. We had become quite accustomed to sleeping on the floor in Japanese inns; but that is a very different sort of thing from sleeping on a few loose boards full of humps and holes, with only a single thin covering to soften the sharp edges. I

do not think any of us ever spent a more uncomfortable night or one in more crowded quarters. Our enjoyment of the occasion was well expressed by the mountaineer of our party, who at about two hours after midnight was heard to exclaim, "Oh, I don't see how I can live until morning!" This voiced the sentiments of us all.

In the morning a fire was started on the ground inside the hut, over which rice was cooked and water heated for tea. There was no pretence of a chimney, and a few stones served for the stove. The smoke soon drove us out, but we were not sorry to get a breath of fresh air once more and to straighten the kinks out of our backs and legs. Everybody was out at daylight to see the sunrise. Long lines of pilgrims, mostly from the peasant classes, could be seen ascending from the lower stations. Pilgrims in Japan are not, as might be expected, old men, but are almost always young, some of them mere boys. Although women were formerly debarred from the summit, the restriction no longer exists; and they are occasionally seen making the ascent. Pilgrims throughout Japan can always be distinguished by their dress, which is of white cotton, consisting of a loose sort of jacket, or coat, with tight-fitting trousers met at the ankles by Japanese socks, or "tabi," generally of white, but occasionally of the dark blue that is commonly worn by the lower classes. Native straw sandals, "waraji," are worn on the feet; while several extra pairs of these are carried on the back. Long staves usually form a part of their outfit, and a small bell which tinkles at every step is always fastened to the belt. Generally, straw capes are worn for protection against the sun or rain. A piece of cloth about the size of a large handkerchief is tied tightly about the forehead; while on the head is worn a large straw coolie hat, conical in shape, covered with white.

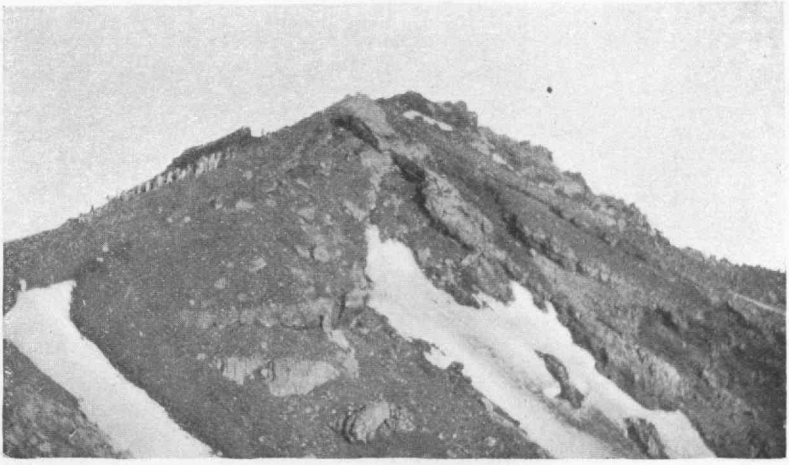
Those who spent the night on the Gotemba side of the mountain gathered, as sunrise approached, at a place on the east wall of the crater. It was there, also, that our party assembled, bundled in sweaters, and none too warm at that. We were surrounded by a hundred or more pilgrims who awaited the sun in silence. The only sound that broke the stillness was the occasional tinkle of a pilgrim's bell as he

Some of our Party with the School Master, on the Summit

moved, or the thud of a rock as it fell in the crater. As the first rays of the sun appeared above the horizon, they were greeted by the pilgrims with muttered prayers. Their devotions were soon over; and then the crowd dispersed, some descending the mountain, others making the circuit of the crater or climbing the various peaks that surround it.

Not many yards from where we saw the sunrise, at a place called Kwan-non-ga-take, a little steam still issues from among numerous small stone cairns piled up by the pilgrims. The heat from the ground is very perceptible as

one walks about, and it is said that an egg may be boiled a few inches below the surface. Yet only a few hundred yards away there is a spring, or rather a well, of clear cold water, the temperature of which, as actually measured by one of our party, was only two degrees Centigrade above freezing. This well must be fed by snow melting from some of the adjacent peaks, although at the time we were

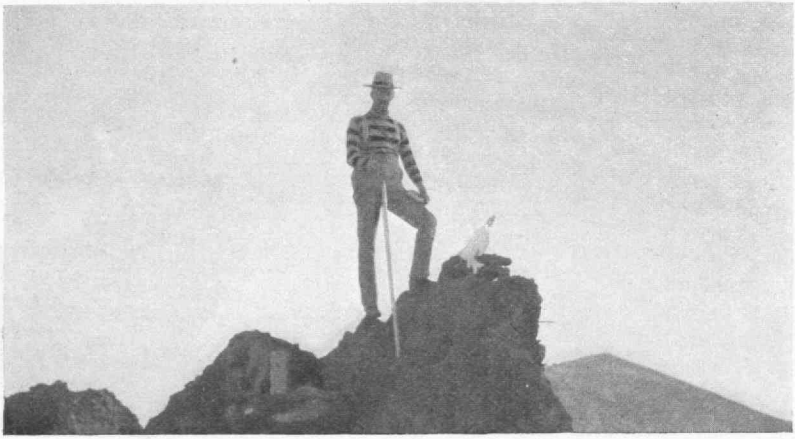


One of the Peaks which surround the Crater

there little snow was to be seen. The steam at Kwan-non-ga-take is now the only sign of activity. The last eruption, which occurred early in the eighteenth century, was not from the main crater, but broke from the south side of the mountain, forming the hump which is now known as Hōei-zan.

After sunrise we returned to the huts, got out the boxes containing provisions, and took our breakfast on a small level space near the crater wall, just outside the shelters. The sun was now well up, and felt very comfortable on our

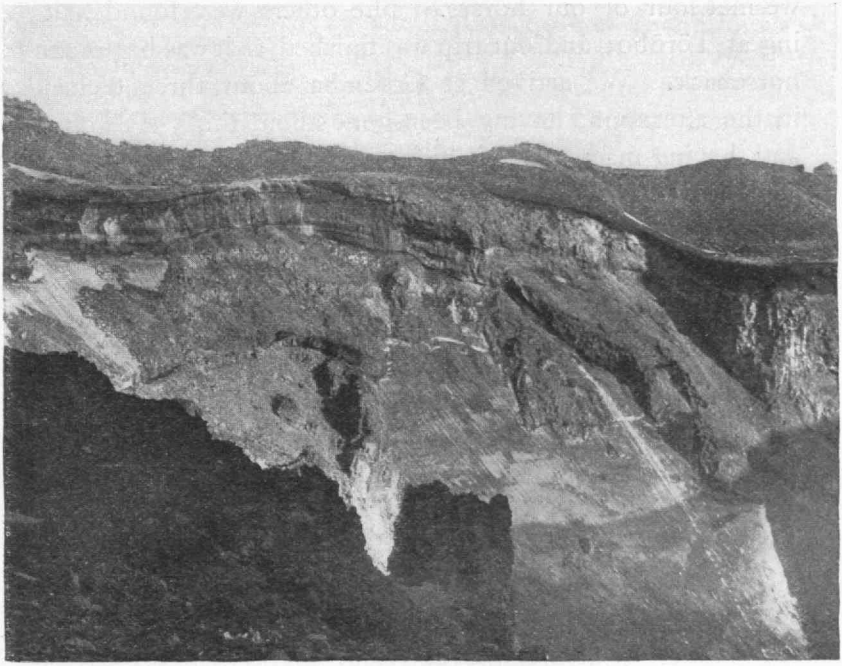
backs as we ate. Breakfast over, we started on the circuit around the crater. The summit of the mountain consists of a series of low peaks surrounding the mouth of the volcano, the highest peak being 12,300 feet above the sea level, and some fifty or a hundred feet above the general surroundings. Over these we found a well-worn path. The crater itself is cup-shaped, nearly circular, about 2,000 feet in diameter, and between 400 and 500 feet deep. The



The Highest Point, 12,300 feet above the Sea

total distance around it is given as one ri, which is equivalent to about 2½ miles. The walls for the most part rise very abruptly, but from a point on the south side the descent into it can be made without any great difficulty over loose lava and cinders. We concluded, however, that we had already done enough climbing; and, as all that could be seen below was visible from the top, we did not go down. On the north side of the summit the path leads down to the group of huts which forms the upper station for those who ascend on the Subashiri side. Near these is

a *torii*, from which is obtained one of the best views of the crater. We completed the circuit, returning to our starting-place about nine o'clock. Most of our baggage had been repacked by the coolies during our absence, and we were soon ready to begin the descent of the mountain.



The Crater

During our brief stay on top there had been no clouds on the summit, but the rather hazy atmosphere destroyed the distant views.

The first part of the descent, as far as the seventh station, is over the same path as the ascent; but from there to the third station the path takes a bee-line down the side of the mountain through loose cinders, into which we sank up to

our ankles at every step. Down this path we ran, or rather skimmed, going four or five feet at each stride. In this manner we descended from the seventh station to the third in about three-quarters of an hour,— a difference in altitude of some 3,500 feet, and a distance that had required some five or six hours in our leisurely ascent. At the third station we met four of our horses. The others were found waiting at Tōrōbō; and our trip was finished, as it was begun, on horseback. We arrived at Gotemba about three o'clock in the afternoon, having been gone about thirty-six hours, and having made one of the most memorable trips of our Japanese journey.

RALPH R. LAWRENCE, '95.

## ON CRITICISM OF THEMES BY STUDENTS*

The themes printed here are precise copies of themes written by Freshmen at the Massachusetts Institute of Technology. Some of these themes will give the reader too low an idea of the abilities of the Institute Freshmen. To present fair specimens of the work in English composition is not the aim of this paper. The object is to tell of a plan, tried last year, of which the chief characteristic is that criticism of themes is done largely by the students.

The details of methods used must be spoken of to some extent in order to make clear the principles on which the work rests. In applying these principles, each teacher will of course have his own scheme.

The student takes home the theme of another, and writes his criticism upon it in red ink. This work counts as half of his work for the week; his own theme, as the other half. His mark is, therefore, the sum of the parts of two fifties. As the next step, both the writer of the theme and the critic study it with the instructor in a consultation of from five to twenty minutes. The records are so kept that, when a man comes for consultation, he talks over all his own themes and also his criticism of other themes. Thus, in the end, the student both gives and receives criticism which is careful and full, and of which the inaccuracies are pointed out by the instructor. Relieved of drudgery, the instructor is enabled to put his whole force on whatever is each student's most vital need.

This method succeeds better with some classes than with others. Classes, like individuals, are sociable, retiring, light-headed, dull, bright, capable of working well only in leading-strings or capable of themselves hacking their way to power. Different as classes are, the work here explained should be useful to them all in the hands of a first-class teacher, and probably, if his method be right, in those

* See Vol. I., p. 441 of the Review.

of a poor one. Under this system a poor teacher may possibly become less of a drag; for, if the method is capable of living, it has its life firmly seated within itself, and the teacher becomes, like the manager of one department of a corporation, potentially greater for good, but with less power to do harm.

To the student the immediate results of this work form a sure foundation for the best use of his abilities, both while he is an undergraduate and when he enters upon his profession. At the end of a lecture, writer and critic have been seen, in the class-room or on the stairs or steps, in attitudes of discussion that at a bound put English composition into the realm of vital affairs. What spectacles and arguments take place among the lodgings is unknown; but it can hardly be doubted that much good is done there, too, since the discussions noticed, though often energetic, are anything but incoherent. Last year several students did such effective work in criticism, and the help they were able to give was so gladly received by their fellows that they were equivalent to an addition to the instructing force, with full pay, in benefit to themselves. As the work progresses, the qualities developed in the student are precisely those which will be most valuable to him in his work in the world. He becomes wide-eyed in seeing faults, workmanlike in the correction of them, sportsmanlike, hitting hard, and giving and demanding fair play. All this he learns to do with dignity and courtesy.

One of the methods for starting this work is to have the writer of the theme, before he begins to write, make a brief character sketch of some person to whom the theme is to be writen. In such cases it becomes the critic's duty to put himself into the mental attitude of this reader. To make the work of more meaning to the men, several devices have been used. Sometimes students hand in requests for themes on subjects about which they wish to know. The instructor then reads these requests to the class, and such men as think they can give the information wanted volunteer to try. Often they make the acquaintance of the questioners, and the work is thus made so much the more

telling. Again, the subjects and titles of themes handed in are read to the class, and the themes are distributed for criticism, as far as possible, to the men who desire them.

The following theme illustrates some of the points already mentioned, and will make the remaining remarks more clear. The corrections which the student makes on the body of the theme are given here in the wide margin. His comment is printed at the end of the theme across the whole page.

## TROUT FISHING IN A BROOK IN THE WOODS

ADDRESSED TO A FISHERMAN WHO THINKS IT TOO MUCH TROUBLE TO SIT ON A WHARF OR IN A BOAT AND WAIT FOR FISH TO COME TO HIS LINE

Fishing for trout in a brook which runs through a dense woods, is a rather difficult task, but it is in such brooks that trout are found in greatest quantities,* and this is what a true fisherman wants rather than an easy time.

It is hard enough to get along in a thick woods without carrying anything, but with a long pole and a line attached to its end, it is very troublesome.

Sometimes to go as short a distance as ten feet along the edge of a brook in the woods, one has to drop the butt end of his pole, wind the line around the point, and then weave * it through a perfect net work of small trees, viands,* and bushes * until he gets to an open space large enough to again allow him to take his pole at its proper end. At this point he has to unwind his line, sometimes to make but one or

This sentence might very well have been omitted. It is not directly connected with the subject.

* great numbers

Reconstruct for emphasis. Going along in a thick woods, without carrying anything, is hard enough; but when a person has to drag a long pole and line with him, it becomes doubly difficult.

I don't understand this operation.

* to weave his line

* vines (probably)
*bushes. Finally he again gets, etc.

* casts ; then he must again go through the place, where he can, . . . with some safety. (at end for emphasis)

two casts,* and then again repeat the trouble of getting to another place where he can with some safety cast his line again.

* Often a fish bites and does not get hooked. When this happens

* Often times a fish will bite and not get hooked, and when such cases happen a long time is spent in getting the line unfastened from limbs of trees which project directly over the stream.

2nd paragraph
* these difficulties which he

Besides the * difficulties one has in making his way along the edges of a brook in the woods, there * are many annoyances to be put up with, such as getting your face into the webs of large spiders, getting your face and hands scratched, and fine needles and small sticks down your back by way of your collar.

*a man who fishes in a brook has to endure other annoyances. He gets (1) his face etc. he gets (2) . . . his . . . his and (3) he has his face etc.

Why do you change your person from the indefinite 3rd to the 2nd, from "one" and "he" to "you"? (on this page)

All these trials, with an occasional tumble into the water from trying to lean too far over the bank, go to make trout fishing * come under the head of sport.

* though exciting, unpleasant.

"Trout fishing in a brook is unpleasant," is the general thought of your theme. Why not end with this thought. Your last six words "side-track" the purpose of the theme.

According to your last sentence, you do not consider fishing in open water a sport. Is that so?

As a whole, the theme has unity because it is all about fishing. But that organised unity, which makes a theme forceful, is lacking. There are a number of thoughts, but they seem all thrown together.

Your sentences are, positively too long. You have exactly 13 thoughts and you should have that many sentences. You have only 8.

Then you have 7 Paragraphs for 8 sentences. This is evidently too many. Two are sufficient for your theme.

Put *one* thought in a sentence and form paragraphs!!!

To make the student feel that his criticisms and comments upon themes can be really of value is no easy task. His perfectly natural scepticism in this respect is an almost insurmountable barrier. It is crossed, however, as he comes to recognize what it means for him to see another student's work. In this light he writes both his criticisms and his own themes. The rubbish and undue confidences so often written to instructors in English prove that instructors have often been held by the college man to be in nature something between a god and a waste-paper basket. This is an animal for which no student can mistake his fellow. Before another student he becomes humanly conscious of the real nature of the demands upon him and of his own shortcomings. At precisely this moment he begins to improve. Work that "would do" for the more abstract instructor he is ashamed to hand to his concrete classmate. His writing gains in arrangement and neatness. He becomes more simple and direct in his statements. His themes grow to mean something to the men they are written for. His criticisms do likewise, and so steadily win his own respect and care.

These advantages to a composition are much the same as those of electric lighting and efficient police to a city. Above these is a further and constructive advantage. A college man soon finds that his fellows will not care about him unless he makes himself cared for. It is necessary for him to win himself friends. If he does not come out of himself, he will be left alone; and, since he can hardly escape his fighting nature, he will struggle with phantoms. To help him to know the real men around him is one of the powers of English composition, and one which the writer of this paper believes can be made of great advantage to composition itself. When the student graduates, the reports he will write, the arguments he will make, will depend for their success not only on his scientific training, but on his knowledge of men and on the training he has had in expressing himself to men. Under the plan here outlined the student has brought home to him the importance of this training.

## A CONTINUOUS DEMAND

* When going in to bat in a game etc.

* pitcher. Right here etc.

* begin

* the

* give the closest attention, in order to find out etc.

* the ball

* curve ;

* case,

to send it exactly to the right place.
He can only do this by etc.

* diminish his attention

* This sentence has three or four ideas in it. Two sentences are made by cutting it in two.

advantage. He must be ready to utilize any opportunity

* Starting to play a game of base-ball, one steps to the plate with his bat, and faces the pitcher * and right here, at the beginning, he must start * in to forget everything else and concentrate his whole mind on his * game. From the time the pitcher begins his preliminary motions until the ball reaches him, he must fasten his eyes * right on the ball, to find out, as nearly as he can, just when and how near * it will come to him. It may come straight, and as swiftly as a rifle bullet, or it may be a deceptive slow curve,* it may come right over the plate, or it may come high, low, out, or in. In any case * he must be ready, just as it reaches the plate, to either let it go by, or hit it in such a way as to send it to exactly * the right place. This he can do only by fixing his whole attention directly on the ball.

He gets a hit, or a base on balls, perhaps, and advances from the plate to the bases, but he can by no means let up * on his direct concentration of mind on the game. He must watch every motion of the pitcher and be ready, if the latter tries to catch him, to get back to his base instantly. * Besides this, he must watch the batter carefully, so that he may cooperate with him to the greatest advantage, be ready * to take advantage of any opportunity to steal

his * base and be prepared, in case of any kind of a hit or emergency, to act immediately and in the best way. *For all of this it is absolutely necessary that he follow * the ball closely and centre * his mind right on the play.

His side gets out, and he goes into the field, and here, still, he must put the whole energy of his mind into the game, so * that as to take in every detail of the play. The ball is likely to be hit in his direction at any time *; it may be a fly, a ground ball, or a swift "liner": it may move * some distance in back of him, away * in front of him, or off to one side. At the crack of the bat he must decide * just where it will come, and be off to * that place instantly. To do this it is obvious that he must have his whole attention fastened on the game.

All through the game, therefore, he must devote to the play the entire strength of his mind. He must be wide awake to everything that is going on in the game. * He must at all times keep in mind every detail of the situation and be prepared for any emergency that may arise. His thoughts cannot wander away for an instant; in fact, he must shut everything else from his mind, and * as it were bury himself in his game.

* a base

* Besides all this,

* should * keep

* in order to take in every

* time. It may etc.

* liner; * go

* Omit away

* judge

* and start for that place

This sentence is nearly a repetition of the main idea and is practically repeated in the beginning of the next paragraph.

* At all times he must keep in mind etc.

and . . . bury himself in the game.

This theme is a theme of exposition. It tells just how a player has to concentrate his mind on the different parts of a ball game; at bat, on the bases, and in the field. It is perfectly logical that there should be four paragraphs in this

theme. The first paragraph speaks of the player at bat, the next on the bases, the third in the field, and the fourth of the game in general. These are four distinct phases and each calls for a new paragraph.

The idea, and especially the expression of "Concentration of mind" is brought in a little too frequently and gets a little monotonous unless varied somewhat. There is also a little too much slang of the game; such expressions as "fasten his eye on the ball," etc.

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## THE CANTEEN QUESTION

You have simply given General Miles' version of the question, and have not attempted the other side. The title should be General Miles' opinion of the Canteen Question.

Not original work, — all quotations from General Miles.

The subject is entirely too broad for a three page essay.

General Miles supports the abolition of the army canteen. He says: "Much has been said concerning the army canteen which when first established was called the "amusement room" and afterwards the "post exchange." It was a place of amusement and recreation for the enlisted men where they could enjoy reading books and papers, playing games etc., and could purchase such refreshments, except liqours * as they desired. It was then an eminently successful institution and promoted the contentment and general welfare of the troops. Later, when what was known as the post traders' establishments were abolished, light wines and beers were authorized to be sold in the canteen. The government has now, by act of Congress, prohibited the sale of intoxicating beverages in the canteen, and it is believed that no injury has resulted thereby and that the law has, in the main, been beneficial. The army is composed principally of young men who have no * formed the habit of using liquor, and although the majority of enlistments actually occur in large cities,

* liquors,

* not

as the recruiting offices are principally located there, a large percentage of the men come from homes in the country and small towns and villages in every part of the United States. The prediction that the change would prevent enlistment and increase desertions has not been fulfilled. Since the law was approved, namely, on Feb. 2, 1901, the recruiting stations have been thronged with men seeking enlistment for service, 25,944 men having enlisted since that date, and the percentage of desertions is now far less than in former years. Desertions most usually occur during the first six months of enlistment, and a much larger percentage of enlistments has been made during the past six months than heretofore. In many cases the men that have deserted belong to a class whose presence in the service was not desirable under any conditions, but whose real character was not known at the time of enlistment."

No pains taken in sentence structure.
Paragraphing good.

There are other officers whose statements go to show that the abolishment of the canteen was a bad measure. Since a man in General Miles's position supports the abolition of the canteen it * will and ought to have great weight.

The only way to see which side is right would be to have a fair trial and testimony from both sides.

* There is no antecedent to "it" expressed. "His opinion" you probably mean.
You have given no reasons complete enough to draw such a conclusion.

With the exception of the last nine lines, the essay is copied, as you say, word for word from a statement of General Miles, and it is therefore not your original work and not my part to attempt to correct quotations. If you desire to discuss

the canteen question from authorities, you should not limit your research to one man. As it is, you have simply given an extract of General Miles' opinion on the subject, and have made no comparisons or arguments whatever. Why not include the statistics of increased drunkenness given out by the Secretary of War, Root, or the findings of the Committee on Military Affairs of congress, if vou wish to use authorities ?

The only original opinion of yours is that included in the last three lines, and that is very vague.

To treat such a subject in three pages, you should give concise statements of all the best arguments on the subject instead of taking over two pages for simply one essential idea. Even then, the subject would be entirely too broad for the space.

---

## LEGS AGAINST STEAM

* One afternoon
unnecessary

*, ,

* left
in order to go through several towns
not connected with your subject

* Par. here

* machine,
Incomplete expression

* At times while steering etc.
Emphasis spoiled here

*three or four inches*
Incomplete expression
What dimension of the sand do you mean ?

* New par. here

One * afternoon, my cousin and I, started to follow the Steamer M—— to N——. We left * on our tandem * the moment the boat left the wharf. For the first two or three miles, the road ran parallel to the river, but after that it leaves * the river in order to go through several towns. We came to the bridge at C—— just in time to get a ride on the draw. * As soon as the draw was closed, we jumped on our machine * for we knew there were four long hills between us and the next bridge. By hard riding we managed to reach the top of the last hill, just as the Steamer whistled for the draw at Rock's Bridge to be opened. What a ride that was down the hill. At times * it seemed as if my wrists must break, steering. At the bottom, were three or four inches * of sand. The machine slid through it at a breakneck speed. We arrived at the bridge however, too late to cross before the draw was opened. * As soon as possible we were

across the bridge and speeding towards the next one, five miles farther down. On reaching here, the steamer was out of sight. The travelled road was considerably longer than that * by which the boat came. Now was the time for sprinting. We had one more chance to win before reaching N——. It seemed as if our machine must break to pieces, such was the awful strain. At last we climb * our last hill and have * only two miles of level, macadam road before us. Those last two miles seemed an eternity but at last we were * in sight of our destination. The race was a tie, but we had the farthest to go.

* *that*
Antecedent is obscure.
The boat came by a river, not a road.

* climbed

* had

* came
A weak ending. Spoils the emphasis of your theme as a whole.

The unity of your whole composition, as well as that of your sentences, is well kept. The emphasis of your sentences is also good. Your unity of expression in some places, however, is not so good. In the sentence in which you mention the bridges and roads in the course of the race, it is difficult for the reader to see at first how the latter affect the race. The best way to show this would be to outline in your first paragraph the course of the race. The reader could also follow the story of the race more easily if its different stages were shown by a sub-division of the theme into paragraphs. Your chief fault, however, is your lack of coherence. The connection between your succeeding sentences is not shown clearly ; and the incoherence confuses the reader and makes it hard for him to follow the theme understandingly.

---

## MAKING A CABIN

The first thing we did was to select a cool and shady spot in the woods. Having found a suitable place we raked all the leaves and all the losse * stones away and cut down all the trees and bushes except four trees. These trees were so situated that they readily served

* loose

as our four corner posts. We * then put in two posts between the two corner posts on each side. Previous to doing this, we had nailed four pieces of scantling around the trees, at a height of eight feet from the ground. Allowing a space for a door and one for a window, we nailed small strips * around the sides about a half a foot apart connecting all the posts and did the same thing to roof. After doing this we had a pretty * substantial frame-work for our little cabin.

* On each side between the two posts we put in two posts.

* connecting all the posts, around the sides

* Omit pretty

Next came the work of thatching the sides and the roof. We decided to thatch the roof first, because if we should thatch the sides first we would be very likely to stick our feet through the thatching in climbing up and down from the roof. For this work we gathered a large quantity of small branches,* which had plenty of leaves on them.

* No,

The thatching was done by weaving the small branches in and out among the strips which had been nailed to the posts and scantling. After we had covered every opening we thatched the sides in the same manner, beginning from the top and working downward. Then our little cabin was finished and very * pretty indeed did it look.

* and it looked pretty indeed.

Many a pleasant afternoon did we spend in that quiet and cool little cabin. When it was too hot to do anything or go any place we would get books and

End.

Not on the subject.

go there and read. Very often we would spend the night out there. In fact, we used to make it a regular camp.

In describing what good times you had at the little camp and in telling why you went there you forgot your subject was on building a camp not what you did there.

I doubt also if you made a camp with a perfectly flat roof, yet you say it was eight feet high all around. Is that the case?

---

## THE BEGINNER IN GOLF

Golf appears as seen etc.

It is not strictly in accordance with good use to commence a sentence with a participial phrase.

As seen by the on-looker, golf appears to be one of the easiest and simplest * games on earth. But yet * how sadly mistaken is that person. He says, "Why, all you have to do is to hit that little white ball." Yes, that is all, but oh, how much trouble lies in hitting that little ball. Then, too, he has * to learn just how far and where, he must send it.

*of games. *But also how sadly mistaken that person is.

*He must learn etc.

"Similarity in the relation of ideas should be made evident by uniformity in the construction of the sentence."

The beginner in golf, must have perseverance and patience. These are very essential, and * before he has mastered the game, they will, in all probability, be completely worn out. The beginner should be careful as to * the choice of his clubs; single piece clubs are much better than the two piece clubs and although, the latter are cheaper, the single piece clubs will pay

*and they will . . . before he has mastered the game.

"Phrases or clauses closely associated in thought should be closely associated in expression."

As here the idea of the probability of these qualifications is associated with the idea of their being essential.

*in

the difference in * cost in the long run. A beginner may safely use cheap balls, for he is sure to ruin most any ball by "topping" * it. Then, too, he should endeavor to obtain a good caddy; one who is able to give him pointers * on the game.

It is best to use a small rubber tee in driving off, although when he * becomes proficient in the game the ball may be "teed" up * on sand. In driving off, a position within easy swinging distance of the ball should be taken; * and the weight of the body should be thrown on the right leg. The "driver" should be grasped firmly in both hands,* near its top; care should be taken to see that the right hand is below the left. The club should be brought back in a full circle and then brought down with a sharp quick stroke. During the whole stroke the eye * must be kept on the ball, for if this is not done the aim is liable to be thrown off. When the club is brought down it must not be stopped right * when ball * is hit but it must be allowed to follow up the ball. If the links are in good condition, a "brassy" is the best club to use, but if the grass is long a "cleak" is perhaps the best thing to use for work on the links.* The work on the "green" is perhaps the hardest part of golf. In "putting" it is best to grasp the club near its middle and hit the ball with a kind of shove stroke.

* of cost

* the reader may not know what topping a ball means.

* points

* one becomes

* teed means a position up therefore "up" is not needed.

* taken in driving off.
Coherence is lacking it would be better to leave the prep. phrase "in driving off" till the last of the sentence.

* "in both hands" should appear at the end of the sentence for coherence.

* For better emphasis put "the eye" etc. first.

* Omit right

* the ball

* thing to use for work on the links. This is superfluous the meaning is perfectly clear without it.

The beginner will often be discouraged but it will not be long before he too, is one of those "crazy" golf enthusiasts.

I hardly think a beginner would succeed if he followed your instructions in some cases. You have left out some very important points on how to distribute the strength of the stroke, which if not made clear to the novice, will cause him much trouble.

Too many sentences are begun with "The beginner" or "A beginner."

You have used such terms as "topping," "teed," "driver," "brassy," "cleak," "links," "greens," "putting," and have not explained their meaning. "The beginner" would have to study this theme with a dictionary in order to get much benefit from it. On the whole this is a fair theme of exposition, although it could be made clearer by making use of improvements suggested above.

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## THE RECOVERY OF BY-PRODUCTS OF THE BLAST FURNACE

The by-products of the blast furnace are about the same as those of the gas works,* but * the * conditions are much different. In the gas works a ton of coal produces about 10,000 cubic feet of gas which carried with it the products to be recovered. In the blast furnace a ton of coal produces from 130,000 * to 180,000 * cubic feet of gas with about the same amount of recoverable matter scattered through it. A group of blast furnaces each consuming about 1000 tons of coal per week will produce an enormous amount of gas. * Thus it appears that very much larger recovering apparatus would be required for the blast furnace gases than would be required for the gas of an ordinary gas plant. * The gases from the blast fur-

*. * Omit but. * The condition in which these by-products of the blast furnace is obtained is much different from the condition of the by-products of the gas works.

* Do not use figures.

* This has nothing to do with the subject therefore omit.

* Theme begins here.

naces have been used for many years for heating the air blast and also as fuel under the boilers,* but * it * has been only in comparatively recent years that a more extended use has been made, and valuable products extracted from them. * These products are ammonia and coal tar. The ammonia is generally converted into ammonium sul-

phate * as * this is the most convenient and salable form of ammonia.

The apparatus required for the recovery of these products generally consists of a preliminary washer for the gases, an atmospheric condensor, and scrubbers. In some places the scrubbers are done away with and two or more washers * used in their * stead.* * The preliminary washer consists of a large boiler-shaped tank with sloping bottom,* and * * is partly filled with tar. Through this tar the hot gases from the furnaces are drawn,* with the

result that the water * in the tar * is partly evaporated and the gases * somewhat cooled, and * at * the same time the particles of tar and of dirt in the gases are caught and precipitated to the bottom of the tank. The heavier tars are drawn off * at intervals into a storage tank. The atmospheric condensors consist of a large number of pipes set *

*. Omit but. It

* This is where your theme should begin, all that you have written thus far has nothing to do with the recovery of the by-products of the blast furnace.
Intended to say theme begins on preceding page.

*, *for

*are. *place of them.

* New Paragraph

*. * Omit and This tank.

* Do you mean sucked through the tar or do you mean forced through the tar ?

* which is *gases (tar ?)

*are

* Omit and. At

* from this washer at intervals and are conducted into a storage tank.

*up

vertically and far enough apart to allow a free circulation of air between them. These pipes are from forty to fifty feet in height with a diameter of one and a half to two and a half feet,* and * are generally about two hundred in number. The pipes are placed in rows and arranged so that the gas passes through everyone of them. They are arranged however so that any row of pipes may be cut out of the circuit * to be cleaned or repaired. At the bottom of each row of pipes is a long tank to receive the lighter tars and ammonia liquors which have condensed in the pipes.*

The scrubbers are huge iron tanks from fifty to one hundred feet in height and ten to twenty-five feet in diameter. These are filled with boards * set on edge and placed very near together. This thoroughly breaks up the gas * and allows full contact with the water which continually runs over these boards. The water * from the last * tank is pumped to the next * and so on * so that * the liquids * are somewhat condensed when they leave the scrubbers. The gases are thoroughly washed in these scrubbers and the remaining tar and ammonia removed. The gas now passes on to the receiver.

Let us see the effect of this different *

*. There

* in order

* I should like to know how the gases pass from one pipe to another; do they pass up one pipe and then down the next pipe etc.?

* Do these boards project from the sides of the tank or how are they set on edge? * (into what?)

* How can water be pumped from the last tank to the next. I think you mean the water is pumped from one tank to the next tank, but you should use a word which expresses what you have in mind. * first

* tank

*. * Omit so that. As the result of the water flowing through a number of tanks
Do you mean liquids if so what liquids? Do you not mean gases?

* pieces of

apparatus on the gas. The gas comes from the blast furnace at a temperature of 400°–600° F, it enters the preliminary washer where the gas is cooled to some extent and much of the heavier tars and dirt is removed. It then passes on to the atmospheric condensors which, in hot weather, are cooled by sprays of cold water. Here the gas is cooled to 70°, or lower, and the lighter tars and moisture contained in the gas is condensed. The scrubber removes the remaining ammonia and tar. The gas is now ready to be used for heating the air blast, for burning under boilers, or to be used in gas engines. The non purified gases from the furnaces cannot be used in the gas engines on account of the tar and also moisture which is present, and,* as it has been shown that in the gas engine only 94.2 cubic feet of gas is required to produce one horse power, while by burning under boilers 794 cubic feet are required, it will be seen that in this one case a large saving has been made.*

The tar is separated from the ammonia liquors by gravitation. The tar is placed in a still and oils of different grades are produced.* These have small values as illuminants except when used in a lucigen or other blast lamp, but they are good heat producers. The pitch which is left behind is in demand for making briquettes, and is used for

* Where has this fact been shown? Never heard of it. Answer (See Banerman's "Metallurgy of Iron" p. 267 and the account of some experiments on the value of blast furnace gas as a producer of power in the Engineering Magazines of 1898 and others.)

* What has this to do with the subject?

* This has absolutely nothing to do with the recovery of the by-products of the blast furnace.

asphalting and roofing. The ammonia liquors are placed in a suitable * still and the ammonia vapors are passed through sulphuric acid.* This ammonium sulphate in addition to its value in chemistry is a valuable fertilizer.

From these furnaces all the fuel required by the iron works outside of that consumed in the furnace itself is produced,* each * ton of coal produces twenty-two to twenty-six pounds of ammonium sulphate, one hundred pounds of pitch and about twenty gallons of oil. The cost of one of these plants is considerable but the profits are large.

* too vague.

* You should not assume that the reader knows how the sulphuric acid acts on the ammonia.

*. Each

The main fault with this theme is that you did not stick to your subject. You should begin your theme with "the gases from " on page one, and end with "the scrubbers remove the remaining ammonia and tar" on page four. Of course it is interesting to know what the purified gas is used for, but unless you change your title to : — "The recovery of the by-products of the blast furnace and some of their uses;" you must omit the uses of the by-products. You are careless in your use of words; for instance the word "last" at the top of page three, you do not mean the "last tank" and so should not use the word "last." Most of your sentences contain but one idea. This is very good. But there are a few sentences which have more than one idea, for instance the long sentence at the bottom of page two beginning with : — "Through this tar, etc." This sentence should be broken up into at least two sentences one beginning with "Through this tar," the other "At the same time." The last page of your theme seems as though it were written simply to fill up space. It is better to write four pages than to write five and give the impression that the fifth page is only written to make the theme five pages long. In many places you leave the subject very vague, for instance you say at the bottom of page three "the gas breaks up." You should tell how and into what it breaks up. In writing this theme you should tell a great deal more about how the tars are separated and how the oils are produced. For these two products are of much more importance than the gas. You confine yourself too much to the purifying of the gas and not enough to the other by-products.

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It would be impossible to give here themes to illustrate or to prove all the statements made in this paper; nor is it needful. One point alone is essential. For the plan pro-

posed to be of use it must have adequate foundation in the critical abilities of the students. The results shown above seem to prove that, at least in the classes in which it has been tried, the work has this foundation. The method has proved excellent in its direct bearing upon the teaching of composition, and perhaps its indirect effects may be more valuable still in bringing into closer relation the student's work in the class-room and his experiences in daily life.

R. G. VALENTINE.

# EDITORIALS

Supreme among the virtues of a republic like ours is reckoned patriotism. Therefore we see the flag floating over our school-houses; therefore we find text-books exalting the national prowess, sometimes at the expense of historical truth; therefore we find the pupils singing verses more fervid than poetical; therefore, in many ways, we behold the emotions of the child at school kept at a fever heat; — all in the sacred name of patriotism. But many a teacher must ask herself if the result is what it should be, if this patriotic "revivalism" is in harmony with the best methods in education, if it would be attempted to arouse any other virtue in the perfervid ways through which custom and the temper of the time compel her to stimulate the pupil's love of country.

Whether this crude teaching of patriotism be the cause or the effect of our limited vision, it is plain, as Dr. Pritchett so admirably points out in his Convocation Address, that the American ideal of the patriot is often limited to the politician who foments wars and the soldier who carries them to a successful end. In this direction, Germany, most military of governments, is far in advance of us. We cannot breed great scholars, high discoverers, builders of epoch-making hypotheses, until, like Germany, France, and even Italy, we appreciate true scholarship, honor "useless" research, and reward this finer as we now do the grosser patriotism.

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A disadvantage of democracies is that they encourage uniformity and put a premium upon mediocrity. That common education which is a necessary consequence of political equality accomplishes wonders in raising the mentally and morally inferior; but at the same time it tends to depress — even to repress — mental and moral superiority. It keeps society fluid and prevents it from hardening into castes; but, as is natural, this fluid society finds its intel-

lectual level at a point far below the highest of which mankind is capable. Of this social level the political leaders in a democracy must be representative. The man put forward for elective office must, above all else, be "safe"; but the genius, the man of great intellect, is never, in that sense, "safe." In the very nature of things he must be a radical; and a steady-going republic fears and ridicules the radical.

All this tends to crush individuality, and to deprive the free-born American of his intellectual liberty. On the other hand, as Dr. Pritchett so clearly shows, this inner freedom of the individual despotic Germany cannot quell, and seemingly has no disposition to destroy. Political liberty the subjects of the Kaiser have not; intellectual *Freiheit* they possess aboundingly. The pressing American problem is, while keeping all the advantages of political liberty, to secure also freedom of intellect, to create the atmosphere which in Germany and in France has produced the mental leaders of our time. The one and only agency which can bring this about is the American (so-called) university.

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How can the university do this? First, by allowing its professors to expand from high-grade schoolmasters into genuine scholars; secondly, by encouraging them primarily to deepen and widen human knowledge, and only secondarily to instruct young men; thirdly, by urging those professors to exert their power, as individuals, to develop individuality and to raise up out of the great mass of "pass" students real "honor" students who have in them the stuff to become great scholars, patient readers of the secrets of the universe, real leaders of civilization; fourthly, as Dr. Pritchett suggests, by creating a new college spirit that shall give more honor to brain, less adulation to brawn.

Who has not heard of the wonderful personal influence of Arnold and Thring in England, of Mark Hopkins, Wayland, Nott, and many others in America? Yet how slow we are to draw the obvious lesson that the great college must have great men! How well we know that our college graduates go to Germany to study

not at this or that university, but with this or that leader of thought and investigation! Yet how little we appreciate that America, too, can have and must have in her colleges such men! — can have them if those colleges will but create the favorable atmosphere, must have them if we are to be a country great in any but a material sense.

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This power of the individual is strikingly illustrated by two of our Institute men, John D. Runkle and William H. Niles, created professors *emeritus* by the Corporation last June. There were many profounder mathematicians than Dr. Runkle; doubtless many teachers of mathematics as excellent as he. But he had that rare strength and vigor of personality which mark the great teacher of men, and he believed the professor's office to demand the direct exercise of that personality upon every student under his control. In demonstrating the calculus, he at the same time expounded, directly or indirectly, the eternal truths of manhood and of life. Not that he mixed mathematics and morality, but he knew how to use the calculus as a means to the making of moral character. He realized that, while he could not teach conic sections so well but that its formulæ would quickly vanish from the students' minds, he could inspire, in some of them at least, an enthusiasm for true manliness which would survive the utmost limit of his years. To the thousands of young men who were fortunate enough to come under his teaching, Runkle, "Walker Professor of Mathematics," may be an uncertain memory; but Runkle, the Man, is a clear-cut and vivid inspiration.

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Dr. Runkle was so ripe in years that it was inevitable that his honorable retirement should be followed closely by his peaceful death,— the crown of a useful and inspiring life. The other professor *emeritus*, although almost as old in service, is so much younger in age that the Institute looks forward to many more years of devotion at his hands. Paradoxical as it may sound,

now that Professor Niles has retired from active duty at the Institute it is likely that his influence there will be greater even than before. The American college requires of its professors so much in detailed work of lecturing, of administration and of committee service, that a teacher has little time for that broad view of teaching, for that philosophical ripening which must precede great personal power. No one realizes this more fully than Professor Niles himself; and, with that buoyancy and that enthusiasm so characteristic of him, he looks forward to a delightful state of living in and yet apart from the Institute, of being close enough to keep in touch with its progress, yet sufficiently away from details to see broadly the sweep and trend of its advancement. With his thirty years' intimate knowledge of the growth of the Institute, with his understanding of and interest in young men, this position of intimate aloofness will be no less valuable to the college than agreeable to him; and it is the devout wish of those who love the Institute that his *emeritus* professorship will equal in length his years of active teaching.

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President Pritchett wisely counts among the chief means of building up intellectual freedom in the American university the creation of a new and different college spirit. One of the most immediate steps toward this would seem to be the pruning off of those undergraduates whose intellectual deficiencies or whose indifference to high ideals of education dilute — if, indeed, they do not actually pollute — the atmosphere of serious study and genuine research. Such men are a great drag upon the teaching force; they exert a constant downward influence upon their more earnest fellows; and, if they succeed in graduating, they markedly lessen the reputation and lower the standards of the graduate body.

This idea deserves greater attention by reason of the large increase in numbers which has taken place in the past two years in the entering classes at the Institute; for there has arisen in many minds the question whether this increase does not offer an opportunity, not to be neglected, of further raising the standard of ability

and scholarship to which candidates for the degree must conform. There are probably few alumni or instructors of the Institute who would not prefer that its graduates, in comparison with those of other similar institutions, should be men of exceptionally high power and attainment rather than that their number alone should increase.

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It is, indeed, desirable that the Institute should enlarge its sphere of usefulness by educating a gradually increasing number of young men; and the rapid growth that is now occurring is a subject of congratulation both from this point of view and as a recognition of its success in the past. But this consideration is of secondary importance in comparison with the maintenance of a standard which shall be higher than that of the smaller technological schools, and which shall be as high as that to which a reasonable proportion of its students can conform.

In order to attain this result, it is of primary importance that a large and efficient corps of teachers be secured, that each be given as far as possible independent responsibility in his own work, and that for each instructor leisure time and adequate facilities for research and study be provided. Also of great, though lesser, importance is the matter of providing ample space and equipment for the purposes of instruction. But, besides these conditions of success which the President and Corporation will undoubtedly secure as fully as possible, it is essential that a high standard of scholarship be maintained by the Faculty through an appropriate system of requirements. Satisfactory as have been, on the whole, the results in the past, it is believed by many that in certain directions the requirements can now be advantageously increased.

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It will be recalled by older alumni that a mark of "Credit" in specified subjects of the first year was formerly required for admission to professional work of the various courses in the second year, and that this requirement was afterwards abolished because it was found to work injustice in many individual cases. In fact, what it

is especially desirable to accomplish is not so much to produce a greater degree of effort on the part of the average man of the class, who perhaps receives a clear record of passes, as either to bring to a higher degree of attainment or, if that be impossible, to eliminate in the early years those students who now only barely fulfil the nominal requirements, either by making up numerous failures after repeated trials or by contenting themselves with the very lowest allowable marks.

It is probably undesirable to attempt to solve this problem by reducing the number of entering students through more difficult examinations or by a more exacting system of marking; for entrance examinations are almost inevitably a better test of the student's preparation in his studies than of the qualities that will insure his professional success. It is no doubt wiser to continue to receive all those students who seem to have a fairly adequate preparation for the work of the Institute, and to give them careful trial during the first year of their course. Under the present system the records of that year are based almost wholly on the daily work of the student in the recitation-room, drawing-room, and laboratory, rather than upon final examinations; they therefore furnish a reliable means of estimating his ability and character. If at the end of the first year he has shown himself incapable of attaining success in professional work, it is a kindness rather than a hardship to bring that fact forcibly to his attention. Even if the conditions imposed lead him then to withdraw and to enter upon a purely business career, his first year's work, having been of a general rather than of a specialized character, will form a valuable supplement to his High School education.

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The best means of accomplishing this desirable result is a matter which the Faculty alone is competent to decide. As an example of such a means, it may be suggested that all first and second-year students who obtained more than a certain small proportion of "low passes" and failures might be required to become five-year students, and to do additional work in subjects to be speci-

fied by the Faculty. But there may be other plans more satisfactory or practicable than this. It seems important only that some plan be adopted to reach and to eliminate those students whose records are now scarcely passable, who lower the working spirit of the class, who consume a disproportionate amount of the time and effort of the instructor without any adequate gain to themselves, and who are among the greatest obstacles to the creation of that new college spirit which Dr. Pritchett and all others who seek the "larger patriotism" deem essential to the real progress of America.

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## THE UNITED STATES GEOLOGICAL SURVEY

"Under the Treasury Department alone, this nation needs the services of men trained in every art and every science."— THEODORE DELAND, *Chief Examiner of Treasury Department.*

In the TECHNOLOGY REVIEW for January, 1902, Mr. François E. Matthes, '95, presented a discussion of "The Task of our Alumni in the Government Service." This review was the introduction to a series showing the relation to this service of a technical education such as that given by the Institute and other high-grade schools. The object of the series is also to show that the nation has need for such men, and that there is ample opportunity for the display and recognition of ability along many lines.

Of all the government bureaus, it is probable that the Geological Survey offers the widest and most attractive field for scientific men, both in original research and in executive lines where technical education and high attainments come into play. It is unrivaled in its development of men as individuals and at the same time as officers of large organizations. It differs from most of the bureaus in the wide latitude of discretion and judgment intrusted to its men. In some of the government offices the sys-

tem is such that there is only one man: every one else is an assistant to that man. The assistants have continually drilled into them the belief that they must follow orders blindly, and must refer even the most trivial matter to the chief. In the Geological Survey, on the other hand, the unwritten law has been that every man is supposed to use his own discretion and judgment within reasonable bounds. The responsibility is imposed upon him of doing things correctly without detailed orders. If he succeeds, the credit and reward are his; and, if he does not judge correctly, he should make place for some one who can.

The Geological Survey differs also from most other government offices in that there are very few positions fixed by law. As a rule, Congress designates a certain number of clerks, stenographers, and assistants of various grades and salaries; and a person appointed to one of these places has no opportunity for promotion, except in the somewhat unlikely contingency of a vacancy occurring in a higher grade. It is an old saying that, in government positions, few die and none resign. While the statistics show that this is not literally true, yet it often seems to be the fact, especially in the clerical branches of the government. In the case of the Geological Survey, however, Congress makes certain lump-sum appropriations to accomplish results which are given in general terms. The compensation of the men who are to accomplish these results is left to the discretion of the Director of the Survey, who makes suitable recommendation to the Secretary of the Interior; and the latter usually acts favorably in the matter. Congress has from time to time considered the desirability of rigidly fixing the positions in the Geological Survey, but, after looking into the matter carefully, has invariably concluded that, under present management, such a course would not be to the best interests of the work. The result is that young men taken into the Geological Survey by civil service examination can be advanced from time to time according to the ability displayed in producing results.

The name "Geological Survey" conveys to many persons an erroneous impression of the functions of this bureau. Geology is usually supposed to relate to rocks and fossils, and in many

minds is synonymous with mineralogy or with some one of the the minor divisions of inorganic matter. In the Geological Survey the word "geology" takes on its widest possible meaning. It implies a study or description of the earth's surface, of its products obtained both above and under ground, and of the phenomena which relate to these. Nothing in this connection is too wide or general or too minute for consideration. The functions of the Geological Survey range from preparing general maps for the whole United States down to the technical examination of the behavior of the atoms in the formation of a mineral substance. Various branches of the Survey devote their time to making general maps in the field, compiling these in the office, outlining forested areas, measuring the rivers, investigating the waters which percolate beneath the surface, obtaining statistics of the production of minerals, of the amount of coal mined or of clay made into bricks. The chemical composition of the rocks and of the substances they contain are made known, the forms of animal and vegetable life which formerly inhabited the earth are studied and classified, careful but artistic photographs and drawings are prepared, illustrating the character of various parts of the country or the markings upon a minute shell. In short, the exploration into the unknown is pushed either in remote parts of Alaska and less-known parts of the United States or patiently sought with the microscope in the laboratory. In this wide range of investigation into the great and the small, opportunities are offered for the display of ability and education unsurpassed in any other organization.

To the young man keen for observation and adventure, who delights to be thrown upon his own resources, there are offered opportunities of penetrating wildernesses never before seen by the white man, of going far away from civilization, where for weeks or months at a time he will be out of reach of mail or telegraph, and must depend for fresh supplies largely upon his success in securing game. He may engage in mapping wildernesses or may trace out the geological structure of a part of the country till then unknown, and whose mineral wealth may in the future attract attention. He may be collecting fossils new to science or impor-

tant as settling great problems of the structure of the earth. In contrast to this rough but alluring life are the opportunities offered for studious, persistent work in thickly settled countries, investigating the method of occurrence of ores or earthy substances of value to mankind. Between these two extremes is every variety of outdoor and indoor occupation, with the stimulus at all times to enter upon the discovery of new conditions or undemonstrated facts.

This wide range of opportunity has been dwelt upon to emphasize the fact that in the Geological Survey, at least, there is opportunity for the highest employment of physical and mental training. The Survey constantly needs young men of courage, character, and high attainments, and is continually calling for them. Considerable difficulty is experienced in getting the right kind of men, and to-day the writer could place a score in good positions if they could be had. There is never an over-supply of men well qualified for the work. The requirements are high, but should be met by the technical schools of the country.

New men are obtained primarily through the examinations held by the Civil Service Commission. These are widely advertised, are open to all, and are intended to sift from the mass of applicants those who are best fitted for the work. No favoritism can be shown in the examination or certification. Some latitude, however, is permitted to the officer making selection of the candidates. He can always have the option of choosing one out of three names, assuming that there are three qualified for the place. Here his individual judgment or taste is allowed to enter; and it is safe to say that, if the officer in charge is a graduate of the Institute, his preference, other things being equal, would be for men who have received its training. Graduates from colleges or technical schools are usually paid for the first year from $60 to $75 per month, depending somewhat upon their age and previous experience, and are detailed as assistants to the chiefs of field parties in the topographic or geologic mapping. They are on probation for six months before receiving a permanent appointment. After a season's experience in the field, their personal qualities being fairly

well known, they are assigned to more important duties, and gradually advance to take charge of independent work. Salaries for a few years range from $1,200 to $1,400, $1,600, and $1,800, promotion being rapid in some cases, and slow in others, according to the ability displayed along particular lines. The older men receive higher compensation when their duties involve the oversight of considerable numbers of field parties or their technical ability along certain lines has become so conspicuous as to attract attention.

In what has been above written, the work of the Geological Survey has been referred to in general terms. To be a little more specific, it may be said that the office of Director of the Geological Survey was created in 1879, at the time when a number of exploring and mapping organizations were abolished and a single Geological Survey authorized. The duty of the Director is primarily to examine the geological structure, mineral resources and products of the National Domain. In order to do this effectively, it was early found that a good map must be prepared of the country to be examined; and, as the National Domain was later held by Congress to include the whole United States, the project for map-making developed into a careful survey of the whole country.

The topographic map which forms the basis of the principal work of the Geological Survey is being prepared in sheets of convenient size and upon a scale of approximately either one mile to the inch in the East or two miles to the inch in the less thickly settled part of the country. This map shows not only the streams, roads, railroads, and towns and the scattered houses in the country, but also all elevations, the latter being indicated by brown contour lines. The sheets are prepared in the field by means of the plane-table, being complete in every respect, except the final inking, before the men leave the field. Few, if any, notes are made, the object being to prepare correct maps, and not to accumulate note-books.

The field sheets, after being inked in the office during the winter, are sent to the Engraving Division, the lines put upon copper, and the final map issued to the public at cost of publication, this being arbitrarily set at five cents a sheet or two dollars per one hundred sheets.

The geologists take in hand the finished topographic map, go into the field, study the rock structure, and show upon the map in appropriate colors the position of the different rock layers which make up the surface of the earth. Their conclusions, when assembled, are shown upon a series of maps relating to the same country, accompanied by a suitable explanatory text, the whole being bound together in what is known as a geologic atlas.

As just noted, there are two great divisions of the Geological Survey, first the topographic, next the geologic. Other divisions related more or less directly to these have developed: for example, the Division of Forestry, which maps the distribution of trees; and the Division of Mineral Researches, which collects the statistics relating to the production of gold, silver, iron, copper, coal, petroleum, and a large number of other metallic and non-metallic substances. There is also the Chemical and Physical Division, which investigates the composition of rocks, waters, and other substances, or studies the behavior of these under various conditions, such as the flowage or rearrangement of the rock masses under heat and pressure. There is the Division of Engraving, which cuts the maps upon copper, lithographs these, and prints on great presses large editions of geographic maps and geologic atlases. There is the Photographic Division, which handles the large collections of photographs made in the field and in the office, develops negatives, and enlarges or reduces maps; the Division of Illustration, which handles all of the illustrative material for the various reports and monographs; and the Editorial Division, that endeavors to put into plain English the somewhat involved statements of those scientific men whose early literary training may have been neglected.

Last to be mentioned in the work of the Geological Survey is the investigation in which the writer is particularly interested. This is what is known as the Hydrographic Branch, which has to do with the study of the water resources of the country,— the measurement of streams for power and irrigation, the examination of the occurrence of underground waters, the consideration of injury done to the water resources by pollution, and many other matters directly connected with the industrial development

of both the East and the West. The principal work of this division has been in connection with the determination of the extent to which the arid lands can be reclaimed by irrigation. This work was authorized in 1888, and has been persistently kept before the attention of the people of the country and of Congress.

The great importance of a full knowledge of the water resources of the country has been appreciated by many public men, and by none more than by Theodore Roosevelt, who, when governor of New York, gave personal attention to the project of measuring the streams of the Adirondacks, in order to obtain official data upon which to base recommendations to the legislature for water storage in these mountains. Mr. Roosevelt's life in the arid West had led him to appreciate the value of water; and, when he became President, one of his first acts was to take up the subject of the preservation of the forests and the regulation of the water supply. In his message to Congress considerable space was devoted to the discussion of these important problems; and, as a result of his vigorous championship, Congress passed a law, which was signed by the President on June 17, 1902, setting aside the proceeds from the disposal of the public lands for the construction of reservoirs and other great works in the arid West. The preliminary examination and the preparation of plans for putting this law into effect were intrusted by the Secretary of the Interior to the Geological Survey, and has become the most important work of the hydrographic branch. There are now in the treasury over $8,000,000 available for construction, and this sum is being increased from day to day. The land which is to be reclaimed will refund the cost, and this being added to what is continually coming in will swell the available sum rapidly to many millions.

To put the Reclamation Law into effect, an engineering organization, known as the Reclamation Service, has been created as a part of the hydrographic branch of the Geological Survey. Young, ambitious, well-trained engineers are needed for this service; and the opportunities for their advancement are unsurpassed. Care is being exercised, in the selection of these men, to insure high character, as the works to be ultimately built must be the best the world

has seen. Good moral and intellectual fibre are needed to construct reservoirs and great canals which must stand for centuries. The Institute is called upon to furnish men of this kind; and they, on the other hand, must demonstrate their ability to succeed by first getting upon the eligible registers of the Civil Service Commission. The energy or good judgment displayed in getting into a position where they can be selected is to a certain extent a guarantee of future success. We need good men, those who not only have been well educated, but men who can think and act carefully for themselves. For such the opportunities are unlimited.

F. H. Newell, '85.

In this series it is impossible to do more than call attention to the benefit the country receives from science applied to such work. To estimate it is out of the question. Even to grasp its full meaning will be possible only to future generations.—Editor (Washington Society of the M.I.T.).

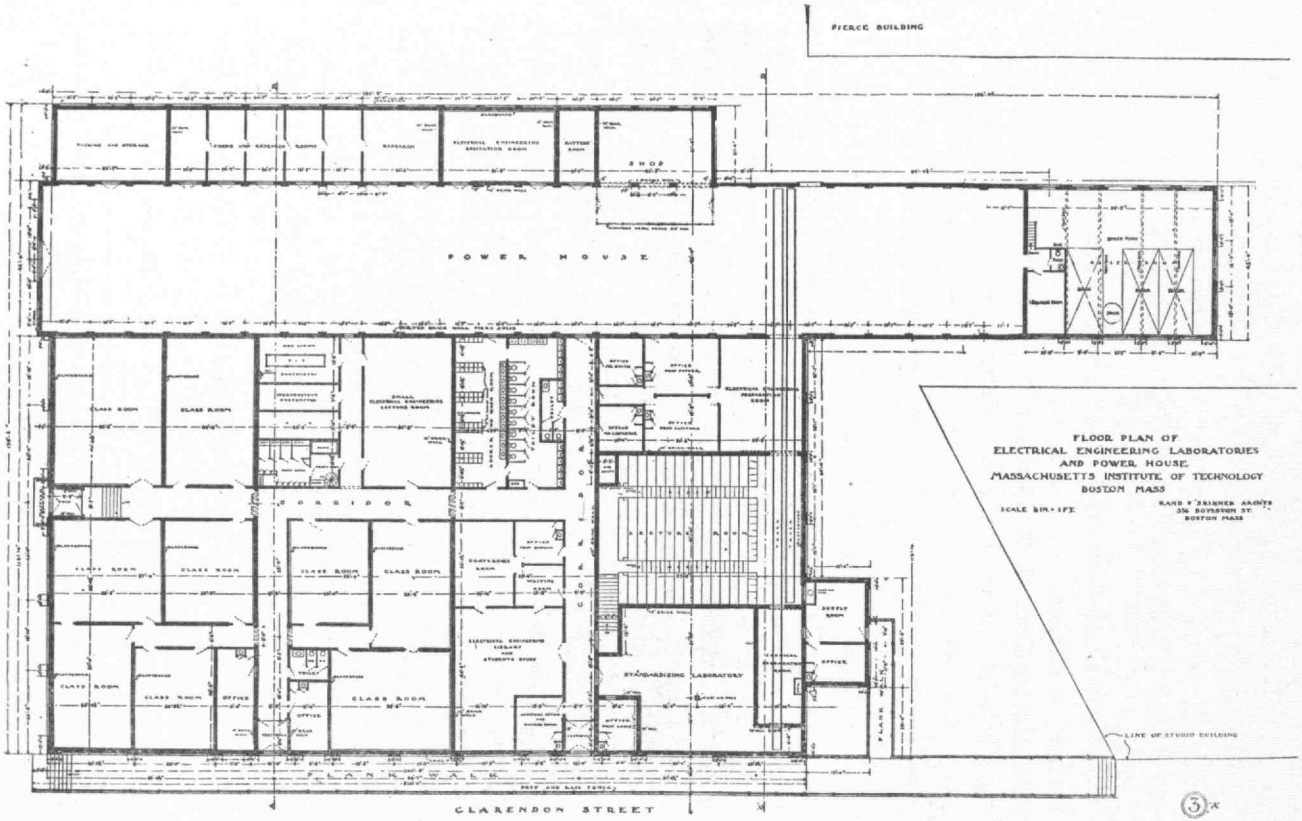
# AUGUSTUS LOWELL LABORATORY OF ELECTRICAL ENGINEERING

The new building for Electrical Engineering at the Institute will be known officially as the Augustus Lowell Laboratory of Electrical Engineering, but it will generally be called the Lowell Building. The plan is the result of considerable study of other building propositions for this and other departments, and combines, as far as possible, the points considered particularly adapted for the special purposes of the new department.* The proposition to relocate the whole Institute on some other site confronted the architects just as the plans were begun, and was considered of sufficient seriousness to warrant this building being planned simply as a temporary structure. Orders were given for the most economical structure which would pass the building laws of the city of Boston, and which would accommodate not only the Electrical Engineering Department, but also the first-year classes in language and mathematics and the lectures and recitations in chemistry.

The story of the erection of the building is, briefly, as follows: On Saturday, June 28, contracts were signed; on Monday, June 30, the lines were laid and work was begun on the excavation; on Tuesday, pile-drivers were at work. Within ten days, portions of the floor were laid, and in ten more, portions of the roof were in place. By the end of another ten days the greater part of the masonry was erected, and the framework of the building was completed. On Monday, September 15, the building was ready to receive furniture and apparatus. In other words, only sixty working days were used between the starting and the completion of the building, as during that period there were two holidays and six days of rain on which no work was done.

The accompanying plan shows a building covering 42,800

* An account of the organization of the now separate Department of Electrical Engineering and of the apparatus and arrangement of the laboratories of this department will appear in an early number of the REVIEW.




FLOOR PLAN OF
ELECTRICAL ENGINEERING LABORATORIES
AND POWER HOUSE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
BOSTON MASS

SCALE 1/8" = 1'-0"

RAND & SKINNER ARCHTS
356 BOYLSTON ST.
BOSTON MASS

3

square feet, and divided into three sections. The most interesting feature is the power house, 40 feet wide and 317 feet long, equipped with a travelling crane for the easy handling of apparatus. New boilers, engines, generators, and heavy machines will be placed here on concrete foundations, and this will become the heart of the Iustitute, as all light and electric power will be generated here and will be sent through conduits to all the other buildings.

The west section is divided into small research-rooms for thesis work and special experimental study. It contains also packing and storage rooms, storage battery space, and a machine-shop.


The east section contains class-rooms, lecture-rooms, offices, and preparation-rooms, lavatory, locker, and toilet-rooms; and ample corridors lead to a broad plank walk by which the building is approached from Clarendon Street, and to an exit on Stanhope Street.

The building is unique in being almost entirely lighted by sky-lights; these are of the saw-tooth variety, so common in weave-shed constructions of recent date.

A system of tracks and traverses is to be run through the power house, preparation-rooms, and lecture-rooms; this will materially assist in the shifting of lecture apparatus, and will greatly increase the effectiveness of the lecture-room. Several rolling tables will be provided, and upon these experiments can be set up outside in the preparation-rooms, and these prepared tables can be brought in while classes are shifting. This makes possible succes-

sive use of the room by classes as different in character as first-year chemistry and fourth-year street railway motors.

The general contract for masonry, carpentry, plastering, roofing, etc.,— in fact, the complete building, excepting steam heating, plumbing, and electric wiring,— was awarded to Mr. Frank B. Gilbreth, of Boston, who regrets daily that he had no technical training, but makes up for it by employing men who have enjoyed it. Too much credit cannot be given to Mr. Gilbreth for the masterly way in which this building has been put through; but to his assistants,— Institute graduates,— Stone, Wilson, and McNaughton, should be given due share of praise; this should be extended, also, to Hamlin, Larkin, and Buzzell of the Worcester Polytechnic; for to a man they have done what all Tech men are noted for doing,— their duty,— and they have done it well.

The steam heating was laid out by Professor Woodbridge, and was put in by Mr. Charles W. Bradlee, '97, of the firm of Bradlee & Chatman. The plumbing was done by Huey Brothers, of whose firm Mr. William Huey is a Tech man. In short, to Technology and to technical education is due the fact that so much work and such good work has been accomplished in so short a time and with so little friction.

THEODORE H. SKINNER, '92,
*Architect.*

# GENERAL INSTITUTE NEWS

## CORPORATION NOTES

The two hundred and ninety-fourth meeting of the Corporation was held at the Institute, Wednesday, October 8.

The following appointments by the Executive Committee were confirmed: —

Dr. William H. Walker, Associate Professor of Industrial Chemistry.

Dr. Charles N. Haskins and Mr. Ernest Miller, Instructors in Mathematics.

Frederick R. Kneeland, Instructor in Analytical Chemistry.

Messrs. Charles B. Hollis, Charles A. Sawyer, Jr., and Charles H. Sisson, Assistants in Mining Engineering and Metallurgy.

Samuel C. Lind and Royal L. Wales, Assistants in Gas Analysis.

Robert S. Williams and Herbert S. Walker, Assistants in Analytical Chemistry.

Dr. Lewis P. Chapin, Assistant in Inorganic Chemistry.

Arthur Elson, Assistant in Mechanical Drawing.

Jeremiah F. O'Neill, Assistant in Woodwork and Foundrywork.

Clarence D. Starr, Assistant in Mechanical Engineering.

Charles W. Sawyer, Assistant in Freehand Drawing.

## FACULTY NOTES

The beginning of the new year notes the changes of administration and registration in effective operation. The administrative reorganization has borne the test of opening of the year successfully, and has demonstrated its value in many respects. The offices for the Secretary and Dean have been fitted up on the west side of the Rogers Building, adjoining the President's office, and effectually detached from the bustle of the general office. In the latter certain simplifications have been effected by the elimination of letter-boxes, typewriters, etc. Mail matter is collected and delivered among the

various buildings by a special messenger, and the problem of better telephone service is the subject of further study. In the Registrar's main office a distinct mailing department has been arranged.

The advent of four naval cadets is accompanied by much better provision for their accommodation than has been heretofore practicable. A commodious recitation-room in Engineering B has been newly equipped for the exclusive use of Captain Hovgaard and the cadets.

Most of the European contingent have returned, including Professors Cross, Lanza, Swain, Bates, Miller, Goodwin, Pearson, and Messrs. Dike and Blachstein. Professor Miller reports finding much of professional interest in the engineering laboratories on the Continent, particularly at Charlottenburg and Dresden. Dr. C. N. Haskins, '97, returns from a year's study in Göttingen to become Instructor in Mathematics. Professor Lanza since his return from Europe has suffered a serious illness, which has proved to be pneumonia, and will prevent him from conducting his Institute work for a considerable time.

The Institute will be represented by President Pritchett at the inauguration of President Wilson of Princeton University, by Dean Burton at the inauguration of Chancellor Strong of the University of Nebraska and of President James of North-western University. Secretary Tyler attended the inauguration of President Wright, of Clark College.

It is expected that a memorial meeting for the late Professor Runkle will be held in Huntington Hall in the near future.

### REGISTRATION

In spite of sundry "conservative" estimates, the number of students at the Institute this year exceeds sixteen hundred, notwithstanding the strict treatment of entrance examination records. The total registration on the opening day was 1,382, a gain of ninety-five over the largest previous record, that of last year. The number of students entering from other colleges is notably large, and represents a wide range of location. Among the col-

leges are Harvard, Williams, Yale, Chicago, Cornell, Georgetown, Colgate, Amherst, Cincinnati, Princeton, Pennsylvania, Dartmouth, New Hampshire, Notre Dame, Brown, Boston, Kenyon, Northwestern, and Nebraska.

The foreign contingent includes two university men from England, two Australians, one Syrian graduate of the Protestant College in Beirût, a graduate of the American Collegiate Institute in Smyrna, several students from Brazil, Mexico, and other Spanish-American countries.

### GENERAL NOTES

Mr. A. M. Knight, after thirteen years of service as Bursar of the Institute, has resigned in consequence of ill-health, and is succeeded by Mr. F. H. Rand.

The National Association of Stationary Engineers held the largest convention of its history during the first week of September, in Boston. Most of the meetings were held in the Institute Buildings; and the chairman of the Local Committee of Arrangements was Mr. P. H. Hogan, who has been for so many years the efficient chief engineer of the Institute of Technology. At the annual meeting of the association, Mr. Hogan was elected vice-president.

The Technique Board for the class of 1904 wishes to bring to the attention of all Institute men the prize competition for a cover design suitable for *Technique*, 1904. The prize is $25, and will be awarded for the design most acceptable to judges appointed by the Technique Board. The design should be for a cover 8 x 10 inches, should have a distinguishing mark, and, together with a sealed envelope containing the designer's name and the distinguishing mark, should be left at the "Cage," directed to "Technique, 1904," on or before Feb. 1, 1903.

## NEWS FROM THE CLASSES

### 1868.

PROF. ROBERT H. RICHARDS, *Sec.*, Mass. Inst. of Technology, Boston.

We have to record the death of one member of the class: Charles C. Gilman, of Marshalltown, Ia., died in July, 1902.—Professor Richards took his class in mining engineering to Nova Scotia and Cape Breton. In this Summer School he was helped by Messrs. C. E. Locke, '96, and S. A. Sawyer, '02. The Waverley Gold Mine is situated about twelve miles out of Halifax. It has, perhaps, 1,500 feet of shafts and 3,000 feet of levels. The mill has sixty stamps of 950 pounds' weight, amalgamating plates averaging 13 feet long, also plates within the battery; and the tailings are treated on four Wilfley tables. The mill was not running full at the time of our visit. The Drummond Coal Mine has very extensive workings. The slopes are down over 5,000 feet. The lateral width of the workings must be over 3,000 feet, with a large amount of new ground not yet touched. It is equipped with fine hoisting engines, fan, compressors, and washing plant. The fine washed coal is coked in twenty beehive ovens. The Nova Scotia Steel and Coal Company owns the old North Sydney coal mines. These mines are extended out two miles under the ocean. The boys were taken a great tramp around the underground workings. The company also owns coal washeries and coking plants at North Sydney and Ferrona, a blast furnace at the latter place, and a steel plant at Trenton, all of which were studied by the students. The Dominion Coal Company owns very extensive tracts of coal lands at the eastern border of Cape Breton. They are mining fourteen thousand tons a day, part of which goes to market and part to the Dominion Steel Company to be coked for the blast furnaces. Methods of rope tramming underground, as well as on the surface, have been brought to great perfection in these mines, as well as at the North Sydney mines of the Nova Scotia Steel and Coal Com-

pany. The Dominion Steel Company has an extensive coking plant, by-product coke ovens, fine ore docks, and stock yard, four great blast furnaces, and eight open hearth steel furnaces. A new rolling mill for rails is now under construction. The town of Sydney has had for the last few years a great boom as a result of the coming of the iron and steel works. This Summer School proved to be one of great interest to the students, of whom there were nineteen, making the party number in all twenty-two.

## 1875.

E. A. W. HAMMATT, *Sec.*, 53 State Street, Boston, Mass.

Since the Class Directory was printed, it has been learned that Frank Conover's address should be 401 North Salem Avenue, Dayton, Ohio.— Horace E. Stower's is 65 Oak Square Avenue, Brighton; and G. W. Lewis has moved from No. 6 to No. 14 Beacon Street.— Benjamin A. Oxnard is married, and lives at 2627 Coliseum Street, New Orleans.— Thomas D. Plympton has been heard from, and also Clifford Weld.— William H. Shockley was in Korea at last account; and William C. Edes was camping in the Sierra Nevada Mountains, engaged in relocating the S. P. R.R.— As a note has been received from Breed, it must be supposed that he is alive, though contrary to common belief.— Goodale was recently in this city, but the secretary did not see him.

## 1876.

JOHN R. FREEMAN, 145 Morris Avenue, Providence, R.I.

Charles R. Fletcher was married in Los Angeles, Cal., a few weeks ago.—J. R. Freeman was tendered the position of chief engineer of the New York Department of Water Supply by the present reform administration, early in the year; and the Merchants Association of New York, in recognition of the results of Mr. Freeman's investigations on this subject two years ago, and to encourage his acceptance, tendered an annual honorarium in addition, equal to the official salary. Mr. Freeman declined the

appointment after carefully investigating the outlook for financial and other permanent support in carrying out the needed reforms, but subsequently assisted the commissioner for some weeks in reviewing conditions in the department and bringing his report of two years ago up to date. In addition to his insurance work, Mr. Freeman is now acting as chief engineer to the committee appointed by the Massachusetts legislature to investigate damming the tidal estuary of the Charles River between Cambridge and Boston at a point near Craigie Bridge, and has a corps of assistants engaged on a variety of observations relating principally to the freeing of the proposed basin from pollution by sewage overflows, etc. During the summer Mr. Freeman served as civilian engineer member of the board appointed by Secretary of War Root to investigate the gun-mounts of the seacoast defences.

1880.

PROF. GEORGE H. BARTON, *Sec.*, Mass. Inst. of Technology, Boston.

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Brown writes in part as follows: "I presume that I shall be looked upon as a renegade from the ideals of the Institute. . . . After I finished at the Institute, I worked for seven months on the P. C. & St. L. R.R. at Columbia, Ohio. Then I took the Mexican fever, and went to that country, and worked for the Mexican National Construction Company for nearly three years, being located for some months in the City of Mexico, later in Zacatecas, and for more than a year engaged on the locating survey south of San Luis Potosi. After returning from Mexico, I spent a winter at home, and then was employed for two years on the C., C., C. & I. Railway in Cleveland, Ohio. . . . Later I decided to enter the ministry, and studied for three years at the Newton Theological Institution, where I graduated in 1890. I was settled that year in Wellington, Conn., where I remained until 1899, when I came to Newport, Vt. In Wellington I was brought more or less into the work of the town, was on the school board much of the time I was there, and was sent to the Connecticut legislature in 1899, where I was house chairman of the Committee on Humane Institutions."—

The Teachers' School of Science Summer School, a party of forty-six, under the leadership of Professor George H. Barton, spent three weeks in New Brunswick, Nova Scotia, and Cape Breton. They studied coal mining and the famous coast section of carboniferous strata at the Joggins, gold mining at Waverley, the picturesque trap ridges at Cape Blomidon, Partridge Island, Wason's Bluff, and Annapolis, and collected large numbers of the minerals contained in them. At Halifax they studied the glacial features, which are exceptionally fine, and sailed around the harbor. At Moncton they saw the famous "Bore," and at Sydney visited the great steel works. Everywhere they were cordially assisted in their studies by the managers of the works and by others. At Annapolis they were given a reception by the board of trade. This summer school is a regular part of the Teachers' School of Science in connection with its course in geology. The instructor in zoölogy also accompanied the class this year.

## 1882.

WALTER B. SNOW, *Sec.*, Watertown, Mass.

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The International Harvester Company, which has been organized under the laws of New Jersey, has purchased the property and business of the leading harvester manufactories of the country, including the Deering Harvester Company, and numbers James Deering among its vice-presidents.—The Chelsea *Gazette* for July 26, 1902, contains a picture and brief description of John F. Low's summer home, Bayhurst, at Duxbury, Mass. Here was born John Gardner Low, 2d, on Aug. 3, 1902.— George F. Chapman, until recently of Evanston, Wyo., now resides with his family on Revere Street, Jamaica Plain, Mass.— His brother, James E. Chapman, spent the summer at Onset, Mass., but has since returned to Evanston, where he has large interests in land and sheep.— In an address on "Training for Citizenship," delivered before the Harvard Teachers' Association in August last, James P. Munroe defined the "Ideal Citizen"

as he who is healthy in body and in mind, who takes life seriously, but

joyously, who does his duty not as a penance, but as a privilege. It is he who does not shirk politics, who votes from knowledge, not from prejudice, who does not seek office, but who, if the office seek him, serves without fear or favor. It is he who loves his country so well that, not waiting bravely to die for her, he is content nobly to live for her. It is he who, fearing no kind or amount of work, labors not by compulsion, but by choice. It is he who, without bemoaning his condition, seeks always to improve it, ambitious to make every moment and every faculty tell. It is he whose morals are as clean as his body, whose mind and eye alike are clear, who respects himself too much to descend to mean actions and low thoughts. It is he whose mind is active, whose hands are skilled, who can fix that mind absolutely on what he is doing and can hold mind and hand down to the present task till it be thoroughly done. It is he who, meeting an obstacle, does not sit despairingly before it, but exerts every faculty to find a way over or under or around that obstacle. It is he who lives in real democratic relations with his kind, having due regard for their rights, yet careful of his own ; having good manners to attract men, tact to lead men, integrity to hold men, power to command men. It is he who in due time marries, devoting himself to his family, but not allowing home life to absorb all his interests. It is he, finally, who, in seeking a good living, seeks also, and more eagerly, the good and useful life.

Munroe is much annoyed over the exploiting of the alumni with a postal card so worded as to give the impression that he has published a twenty-five cent history of the Institute. Those who send their quarters and receive in return only a magazine article which is by no means "complete," will, he thinks, feel like those misguided persons who, upon responding to an advertisement to "send fifty cents and secure a fine steel engraving of George Washington," are rewarded with a two-cent postage stamp.

## 1883.

HARVEY S. CHASE, *Sec.*, 8 Congress Street, Boston, Mass.

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Julien W. Vose is busy building on Massachusetts Avenue, Boston, the first and only entirely fire-proof piano factory. Each machine will be run by its own motor, and the entire plant will contain the very latest ideas in piano construction.— Winthrop

Alexander is instructor in building construction at the Boston Architectural Club, and a specialist on heavy construction and superintendence, with offices at 52 Kilby Street, Boston, and 106 Main Street, Brockton.— W. B. Fuller is at present resident engineer in charge of the construction of a large masonry dam at Boonton, N.J., and a masonry and steel pipe conduit from Boonton to Jersey City. The dam is to be about 3,000 feet long, and 110 feet high at its highest point. The conduit is to be eight and one-half feet in diameter. The mechanical filter plant at Little Falls, N.J., the construction of which has occupied Fuller's time for the last year or so, is now completed; and the citizens of Paterson are now being furnished the finest water known to science.— J. G. Eppendorf writes that he spent a very busy summer and fall in a business way, and has at present several large contracts on houses out of town.

## 1884.

DR. AUGUSTUS H. GILL, *Sec.*, Mass. Inst. of Technology, Boston.

Rotch went to Berlin in May to attend a meeting of the International Aëronautical Committee, of which he is the American member. His project to explore the tropical atmosphere with kites flown from a steamer was heartily indorsed, and German co-operation promised if he gets the grant of $10,000 requested from the Carnegie Institution. His observatory on Blue Hill has been enlarged by the addition of a fire-proof library at a cost exceeding $5,000.

## 1885.

PROF. E. B. HOMER, *Sec.*, Rhode Island School of Design, Providence, R.I.

At the last annual dinner fourteen members were present. Charles A. Brown was elected class president for the ensuing year.— David Baker is now located at Sydney, Cape Breton.— Charles W. Eaton is with the National Dredging Company, at present making a government channel, seven and one-half miles long, at Gulfport, Miss. He writes: "It gives me pleasure to

hear of the good times the boys up in God's country have each year, but I have been unable to attend them for this is the fifth time. I am now at work making a government channel from Ship Island Anchorage to a long pier built by the Gulf & Ship Island R.R. at Gulfport, Miss., about seven and one-half miles. As it is an exposed place and we have an expensive plant here, it will be impossible for me to leave. One has only to live from Cuba to Texas, as I have for five years, to begin to realize what one leaves behind when one leaves Boston and the Tech. This is especially the case with one's better half. At present I am living as near the north as possible, having sent to Saginaw, Mich., and obtained a portable house of three rooms, one to cook in, one to eat in, and one to sleep and swear in. We used to hear of how the boys at the Tech had to work and hustle; hence one need never feel afraid of a rival Tech ever being established down here; for the only excuse that they can give for such unqualified laziness is the climate. I have to get out and take a run around the house occasionally to keep from using too much tongue energy. One consolation about my work here, it can be carried on for twelve months each year, while North it must stop during the winter. We lack both spring and fall, and have nine months solid summer and three months getting ready for hot weather. . . . Remember me to all the boys and extend my best wishes for their pleasure on the night of the class supper, and for their success always." . .—One of Fred M. Kimball's recent trips in the interests of the General Electric Company covered the whole of the Pacific coast from Southern California to Northern Washington.— It is with deep regret that the secretary has to announce the death of John M. Kimball, as noticed elsewhere in this issue. This is the fourth break in the class organization.— Isaac W. Litchfield is in charge of the purchasing and sales departments of the Acme Harvester Company of Peoria, Ill. "Ike" writes, "Just the sort of job I have long wished for."— Hugh MacRae suggests that the class fund be so increased that "in our old age we could meet together, and have suppers provided by the 4 per cent. interest therefrom."— Everett Morss has been putting up two large build-

ings, of cement construction, for the enlarging business of the Simplex Electrical Company.— Nathaniel G. Robinson is treasurer of the Wyoming Shovel Works, Wyoming, Pa.

President Roosevelt has said that the forest and water problems are perhaps the most vital internal questions of the United States; and, because they are of such importance, books of real value dealing with them are specially welcome. The best work on the water problem that we have yet had is "Irrigation in the United States" (Crowell) by Frederick Haynes Newell. Mr. Newell is undoubtedly the American authority on the subject of the theory and the practice of irrigation. For many years he has been chief of the division of hydrography of the United States Geological Survey. He has made the study of the methods of irrigation in use in the arid regions his specialty, also the opportunities that exist in those regions for utilizing other and more effective methods; and it is very largely to him that we owe that invaluable series of "Water Supply and Irrigation Papers" which has greatly expanded public knowledge of the whole theme. He brings to the task of writing his book, therefore, the ripest and broadest knowledge to be had in this country. The resulting volume is on many accounts valuable. It is richly illustrated, both with figures and diagrams in the text and also with plates. These show all sorts of devices for raising water, conducting or diverting it to land, distributing it over the land, regulating its flow, and storing it for use in times of drought. Mr. Newell's book is of immediate practical use, because he devotes himself so much to the details of his subject as they affect many different tracts of country. He gives a thousand and one practical devices which men of small means can introduce to bring water to crops that need them at once.— [Boston *Herald*, April 5, 1902.]

## 1886.

PROF. ARTHUR G. ROBBINS, *Sec.*, Mass. Inst. of Technology, Boston.

Professor Miller spent part of his vacation in Europe, partly for pleasure and partly for the purpose of visiting European engineering laboratories.—Cutter reports the birth of a son on May 11, and a similar event occurred at the home of the secretary on July 13.— Following is a clipping from *Science* of Aug. 8, 1902: "Major Josiah Pierce, Jr., a well-known civil engineer, died at Washington on July 31. He was born in 1861, and had been connected with the Coast and Geodetic and Geological Surveys, and had been

professor of civil engineering at the Columbian and Catholic Universities. He served as a major of engineers in the Spanish War, and had been engaged in a number of topographical surveys."

1887.

EDWARD G. THOMAS, *Sec.*, 4 State Street, Boston, Mass.

T. W. Sprague has gone to California on an investigation of a mine near Fresno, and will be away about three weeks.— Fred Thompson spent a month's leave of absence at the Profile House with his family.— Giles Taintor is building a house on Brattle Street, Cambridge.— E. G. Thomas will present at the Street Railway Convention in Detroit, in October, a new rail bond for electric roads, which, of course, is the "best ever."— Miner Robinson has given up, to a large extent, electrical contracting, and is confining his attention to the manufacture of electrical specialties of his own invention, under the name of the Renim Specialty Company, office in the Weld Building, Boston.— H. S. Adams and Miner Robinson attended the launching of the "Des Moines" at the Fore River Engine Works on September 20.

1888.

WILLIAM G. SNOW, *Sec.*, 245 North Broad Street, Philadelphia, Pa.

W. G. Besler has resigned his position as general superintendent of the Philadelphia & Reading Railway to become the general manager of the Central Railroad of New Jersey, with headquarters in New York.

1889.

WALTER H. KILHAM, *Sec.*, 9 Park Street, Boston, Mass.

The firm of Hollis French & Allen Hubbard has recently been appointed engineers for the city of Boston by the School-house Commission, to have charge of all domestic engineering in the city school-houses, and to draw the plans and specifications for new work and alterations on old work. They have recently moved into remarkably well-appointed and spacious offices in the Albany

Building, which are a model of convenience in every way. Hollis French has a second son, born last July, who has been named Stanley Goodwin French.— Cilley is still connected with the New East River Bridge, and has lately been engaged upon investigations and calculations of the strength of cables, which he has carried much farther than ever before.— Whiting is contemplating a journey into the interior of Thibet.— Rankin and Pietsch were in town recently.

## 1890.

GEORGE L. GILMORE, *Sec.*, Lexington, Mass.

Edward Robinson was married July 2 to Miss Clara Ester Schouten at Rockport, N.Y. They will be "at home" after October 1 at 8 Chestnut Street, Potsdam, N.Y.— Joseph B. Baker, consulting electrical engineer, is now located at 161 Summer Street, Boston.— John Richardson Hall, son of the late Captain Henry T. and Bessie Judd Hall, died at his residence in Needham on Thursday, August 7. He was born in Augusta, Me., in 1868, graduated from Phillips Academy, Andover, in 1886, and from the Institute of Technology in 1890 as an electrical engineer. He was afterwards associated with the Bell Telephone Company in New York and later in Chicago, until 1893, when, his health failing from overwork, he gave up business, and has since been living at various health resorts in California and other Western States until the past year, when he has been confined to his home.— Plans are now being arranged for the formation of a corporation by a syndicate of capitalists represented by Gardner T. Voorhees, the cold storage and refrigerating engineer, which will practically revolutionize the cold storage and warehouse business of Boston. Just who the capitalists are who are backing the new concern is a secret which is being carefully guarded ; but negotiations have already gone so far that Mr. Voorhees has been in consultation with the traffic departments of the Boston & Maine and New York, New Haven & Hartford Railroad Companies. This business is now controlled by the Quincy Market Cold Storage Company and the Eastern Cold Storage Company. The former is capitalized for $1,000,000

and pays 6 per cent. dividends; and the Eastern Company is capitalized for $300,000 and has paid regular 6 per cent. dividends, although its last dividend was at the rate of 5 per cent. The present plans, according to Mr. Voorhees, provide for the reorganization of these two companies; but people who profess to know claim that the "reorganization" will in reality amount to nothing more or less than their absorption by the new company. The plants of the Quincy company are now located upon real estate having an estimated value of at least $500,000; and it is figured that, if the business could be concentrated in the railroad yards, the trade could be served as well as now, and the business would be greatly increased and more economically handled. Mr. Voorhees was very explicit yesterday in stating that the new company was to make no attack on the older concerns. When asked how the controlling interests in the Quincy and Eastern companies looked on the movement, he admitted that they "didn't know much about it yet." He said, further, that he had no doubt the new company would be willing to take over the stock of the Quincy and Eastern companies at the listed market price. It is claimed that, with prospective changes in the methods of handling the business and the increased business which would ensue through the relocation of the plants and having the railroads directly interested in the project, a consolidated Boston company should be able to show 10 per cent. earnings upon a $3,000,000 capitalization. If, however, the existing companies hold out and refuse to join the combination, the new concern, it is understood, is prepared to build its own plant, and enter the field in competition with the older companies.— Thaxter N. Tripp was married to Miss Mary Kunhardt on October 7 at the Church of the New Jerusalem, Bowdoin Street, Boston. They will be at home after December 1 at 11 Baltimore Street, Lynn, Mass.

1891.

CHARLES GARRISON, *Sec.*, Lexington, Mass.

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Henry G. Bradlee and H. A. Fiske have spent the summer as cottagers at Crow Point, Hingham, Mass.— George H. Spooner has left the Boston Board of Fire Underwriters, and accepted a

position as inspector with the Underwriters' Bureau of New England.— Owing to ill-health, Ed. Cunningham has gone to California for an indefinite period. — M. W. Greer is back in the States after a long trip in Alaska. He is located at Milwaukee, and is agent for an automatic stoker.

1892.

PROF. SEVERANCE BURRAGE, *Sec.*, Purdue University, Lafayette, Ind.

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Francis Walker has severed his connection with Western Reserve University, and will spend this year in study abroad.—"Jack" Highlands, the famous pitcher, is engaged in some manufacturing business in Boston.— George H. Lukes, Dwight Robinson, and Charles Wallace spent several weeks last summer looking over some of the long distance, high voltage transmission plants in California. They continued their trip as far as Seattle, where they were joined by another '92 electrical, J. B. Lukes. — Dr. George Vincent Wendell was married on the 29th of July to Miss Mary Hitchcock, of Boston.— Dr. Arthur M. Worthington, who is practising in Dedham, was in the Boston City Hospital with some throat trouble for several weeks early last summer. — Herbert R. Moody received his A.M. and Ph.D. degrees from Columbia in 1901, and for the last year was located at Hobart College, Geneva, N.Y., as professor of chemistry.— Tom Creden is with Stone and Webster, and is located in Sydney, Cape Breton, where he has charge of an electric light plant, an inter-urban electric road, and a steam ferry line.— Arrangements are being made for the decennial meeting of this class, said meeting to take place during the Christmas holidays about the time of the regular alumni meeting; and it is hoped that every member of the class will make an effort to be present. The arrangements will be in charge of Leonard Metcalf, who will send out notices at an early date.

1893.

FREDERIC H. FAY, *Sec.*, 60 City Hall, Boston, Mass.

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Announcement is made of the engagement of Miss Mary H. Huse, of Dover, N.H., to our former class president, William

Brewster Page, of Fitchburg.— The following notice of Rigby Wason is from the June 14th issue of *M. A. P.* (Mainly about People), a prominent London paper, edited by T. P. O'Connor: "Mr. Rigby Wason, who was on Wednesday called to the bar at the Middle Temple, is the eldest son of Mr. Eugene Wason, the well known M.P. Young Wason has had already an exceptionally varied and, I must say, an exceptionally distinguished career. He is an old Rugbeian, who played in the Rugby fifteen and shot in the eight. Anticipating, perhaps, the American invasion, young Wason did not go to an English university to complete his education. He went instead to the Institute of Technology, Boston, where he took the degree of Bachelor of Science. On graduating, he at once entered the post-office, where he soon rose to be senior officer, in the electric light branch, at St. Martins-le-Grand. He was then sent out by the crown agents for the colonies to assist in the installation of the electric light at Malta, and was at the outbreak of the war acting as constructional engineer to the Expanded Metal Company in Manchester. When the war broke out, the fever caught him; and he served throughout the early stages with the cyclist section of the C. I. V., and is still a keen member of the cyclist section of the 'Devil's Own.' Mr. Wason represents the third generation of the family in the Middle Temple. His paternal grandfather, Rigby Wason, was three times returned M.P. for Ipswich, and was also a barrister of the Middle Temple; Eugene Wason, the father, belongs to the Middle Temple; and to-day his uncle, John Cathcart Wason, M.P., completes the list. His maternal grandfather, Mr. Charles Reynolds Williams, D.L., of Dolymelynllyn, near Dolgelly, was for many years a member of the council of the Incorporated Law Society. Young Wason, like his father, has made the 'grand tour.' I wish him every success in his profession." We who know Wason are confident that in this new field he will bring not only honor o his distinguished family, but credit to his Alma Mater as well. Already we count him one of our leading alumni of England, and we heartily wish for him a successful and distinguished career. — James A. Emery, of Birmingham, Ala., called upon a number

of Boston classmates while North on his vacation in September. For a year following graduation, Emery was an assistant in the civil engineering department at the Institute. In 1894 he entered the service of William Wharton, Jr. & Co., of Philadelphia, with which firm he had been during the summer of 1893; and for more than two years he remained in this position, engaged in a variety of street railway work. From 1897 to 1899 he was in private practice as a street railway engineer in Boston. From July, 1899, until the present time Emery has been in the employ of Ford, Bacon & Davis, of New York City, for whom he has been assistant engineer in charge of construction of the New Orleans & Carrollton Railroad, and engineer of construction of the Atlanta Rapid Transit Company. In the latter position he had charge of the design and construction of about thirty-five miles of street railway. Since August, 1901, he has been manager of construction of the Birmingham Railway, Light and Power Company, in charge of the reconstruction and extension of its street railway, electric, and gas departments. The street railway system alone, which is being entirely rebuilt, is over one hundred miles in extent. Emery's address is 2104 First Avenue, Birmingham, Ala.— During the recent war practice on Long Island Sound, in which the army, the navy, and certain militia organizations participated, A. L. Kendall served with the First Massachusetts Regiment of Heavy Artillery at Fort Rodman.— Philip E. Perry has been appointed teacher of sloyd in the Lexington (Mass.) high school, where he begins his work with the present school year. He was formerly on the engineering staff of the Bangor & Aroostook Railroad, and later was connected with the engineering department of the American Bell Telephone Company in Boston. Apparently, he intends to devote himself henceforth to teaching; for, in addition to his work in Lexington, he has private classes in sloyd work, among them being that of a private school in Belmont. Perry's address is 60 Elm Street, Jamaica Plain, Mass.— The firm of Hale & Codman, electrical engineers and manufacturers' agents, of which John Sturgis Codman, '93, is a member, has moved from 31 Milk Street to enlarged quarters at 220 Devonshire Street, Boston.— In *Forest and Stream* of Aug.

10, 1901, Charles Winthrop Sawyer has a long and very readable article entitled "Three Rifles and a Shot-gun," describing particularly four of his pet firearms, and, incidentally, giving some good advice to boys and other novices in the art of shooting. Sawyer is a great lover of outdoor life, is an excellent shot, and an expert on the subject of firearms, of which he has a choice collection. Although leading a busy life as a practising architect and a teacher of architecture, he usually manages to crowd his year's work into ten months of activity and to spend the remainder of the year deep in the woods in company with his rods and guns.— James C. Boyd has resigned as roadmaster of the Boston Elevated Railway to become engineer of the extension of the Bangor & Aroostook Railroad, the same road with which he was connected several years ago. His recovery from his severe accident of last year, in which he was pushed from the elevated railway structure by an unexpected train, is so complete that he is now able to go about with only a slight limp. Boyd's address is Fort Kent, Me.— Arthur A. Shurtleff, landscape architect with Olmsted Brothers, Brookline, and instructor in landscape architecture at Harvard University, is spending September and a part of October abroad. He joined Mr. Olmsted in Paris, and expected later to visit Antwerp, The Hague, Frankfort, Cologne, and Hamburg, spending the most of his time in the last named city. On this trip, Shurtleff combines pleasure with the study of his profession.— George K. Dearborn, until recently with the American Telephone and Telegraph Company of Pittsburg, Pa., has returned to Boston, and joined the engineering department of the New England Telephone and Telegraph Company.

1894.

SAMUEL C. PRESCOTT, *Sec.*, Mass. Inst. of Technology, Boston.

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It is with deep regret that the secretary has to announce the death of Henry Belin duPont, which took place on July 8, at Santa Barbara, Cal. Mr. duPont belonged to an old Wilmington, Del., family, and entered the Institute in September, 1890. He chose chemical engineering as his profession, and was graduated

with his class in '94. The following year he returned to the Institute for graduate work in chemistry. Upon leaving the Institute in 1895, he associated himself with the well-known firm of duPont De Nemours & Co. in his home city. Later he became engaged in private business enterprises, but was obliged to relinquish them because of the failure of his health. About two years ago he removed to Phœnix, Ariz., from which place he wrote that he was "health-seeking and ranching"; but it was apparently too late to regain his lost health. In his death all his classmates and business associates will feel a sense of personal loss, and the sympathy of all will be extended to his bereaved wife and family.— Since the last class news appeared several '94 men have entered into matrimonial alliances. On May 29 Albert Ball Tenney and Miss Mary Augusta Comey, of Lynn, were united in marriage.— On Tuesday, July 29, occurred a double wedding of interest to '92 men as well as to '94, the grooms being Mr. George V. Wendell, '92, and Frederick Maynard Mann, of our own class, and the brides Misses Mary and Grace Hitchcock. Mr. Mann has recently been appointed professor of architecture in Washington University, St. Louis, and has already begun his work there.— Miss Annabel Lee was married to Mr. Colbert Anderson MacClure on Wednesday, September 17, at Ilka, Melvale, Md.— Francis C. Green is general superintendent of the Consolidated Car Heating Company, Albany.— Clarence D. Pollock is assistant engineer of highways, Bureau of Highways, Borough of Brooklyn, with office in Room 21, Municipal Building, Brooklyn, N.Y.— J. Calvin Locke is also with the Brooklyn Department of Highways.— Richard W. Proctor visited his old home in Massachusetts in August, and incidentally paid a visit to the Institute. The secretary regrets that he was absent at the time, as it is always a pleasure to see the members of the class when they come back.— The *Christian Register* for May 22 contained an interesting article made up essentially of extracts from the letters of Frederick M. Noa, who spent several months in Cuba, as the representative of the American Unitarian Association, investigating the social, economic, and religious conditions of the island. He found that since the American occupation free public

worship has been allowed for the first time in four hundred years. Already several Protestant denominations are doing mission work there, and have established struggling schools, churches, or missions in twenty-five or thirty cities. There are now about eight thousand organized Protestants in Cuba. Noa's observations were not confined to religious matters. He visited some of the public schools, and remarked the fine results which may be directly traced to the Harvard Summer School for Cuban teachers. A paragraph from the article gives an idea of the resources of the island and our unaccepted opportunity to do something for Cuba. "A day spent in tramping through the mountains back of Santiago revealed to me the astonishing natural wealth going to waste. Masses of iron lay strewn in the paths; alluvial sand, full of magnetic iron particles, was under my feet; wild cotton growing five or six feet high might be gathered everywhere. The time must come when Santiago will be a second Pittsburg, teeming with foundries and manufactures. If it could only be burned into the American mind what opportunities are here, the United States tariff would be lowered instantly; but I suppose, as has been the experience with South America, Britain and all the European nations will reap the golden harvest long before we of the United States realize our marvellous heritage. To give Cuba not a petty reduction of twenty per cent. on tobacco and sugar, but absolute free trade with America, is not alone a deep moral obligation, but to the manifest advantage of both parties. Perhaps we shall realize this when we wake up some day to find Cuba a prosperous agricultural, mining, and manufacturing country, with many diversified industries. Meanwhile she is poor, and suffering acute distress and destitution." It is gratifying to learn that Mr. Noa is to continue his work in Cuba during the coming winter, but it will be real mission work rather than investigation or observation.— William H. King spent a little time in Boston on his way back to New York from Nova Scotia, where he spent his vacation. — Alan A. Claflin and Walter E. Piper each report the advent of a daughter during the past few months, while Joseph W. Phelan is the proud possessor of a young son. Surely, Course V is enterprising.— It is hoped to have an informal class dinner at the Club

at some time in October. Notices will be sent to all within easy reach of Boston.— Mr. and Mrs. William Edward Livingston, of Lowell, have announced the marriage of their daughter Ethel to Mr. Harry Stafford Duckworth. The wedding took place on Wednesday, September 24. Mr. and Mrs. Duckworth will reside at 127 Silver Street, Dover, N. H.—Mason S. Chace was recently elected president of the Crescent Shipyard Company of Elizabethport, N.J.

1895.

GEORGE W. HAYDEN, *Sec.*, 493 Warren Street, Roxbury, Mass.

B. C. Donham was married to Miss Edith A. McKeen, of Alameda, Cal., at Yokohama, Japan, on August 4. Until May, 1900, he was in San Francisco and vicinity, first with the San Francisco Bridge Company, and later with the Spreckels Sugar Company on irrigation work. Since that time he has been chief engineer for the firm of Collbram & Bostwick, contractors, with headquarters at Seoul, Korea. They have been engaged on many important government works in the way of railroads, highways, harbor improvements, etc., their latest task being the design and construction of a water-works system for Seoul.— L. H. Prentice Company, engineers and contractors for steam and hot water heating and ventilating apparatus, announce that they have opened a New York office at 114–118 Liberty Street, which will be under the management of A. L. Canfield, who will represent them in the territory east of and including Pittsburg, Pa.

1896.

EDWARD S. MANSFIELD, *Sec.*, 70 State Street, Boston, Mass.

C. E. Lawrence, formerly with the New York and New Jersey Telephone Company, has been appointed resident engineer of the Payne Engineering Company, 141 Broadway, New York City.— On March 8, 1902, the family of A. D. Maclachlan was increased by the advent of twin boys, named Walter Lothian and Wallace Gardner.— Carl Edmund von Jungenfeld, at one time connected with the class, was in town during the middle of September, and

reports that since leaving Tech he has travelled quite extensively through Central America and Mexico. He is now connected with Henry W. Peabody & Co., 17 State Street, New York City, as a construction engineer, and is about to sail for the Philippines, where he will be engaged in engineering work, a part of which is to build a crematory for garbage. After completing his work in the Philippines, he has made partial arrangements to go to China on other engineering work. He also reports that he has a wife and child who will accompany him to the Philippines.— Charles E. Locke reports a very enjoyable and profitable time at the Summer School. Since returning, he, together with E. C. Jacobs, took a trip through the West, where they inspected the copper mines in and around Houghton and the iron mines at Ishpeming, Mich., and the Loraine Steel Plant in Ohio.— A letter from L. A. Cary announces that he has been married for some little time, and is settled in Kimberly, South Africa.— William P. Anderson was married to Miss Marguerite Tullidge in Cincinnati on Aug. 20, 1902. They are to reside in Cincinnati.— J. H. Manahan, of the American Stoker Company, has been spending the summer in Boston, where he has been attending to private business.— Rockwell, Hultman, and Mansfield, the committee appointed at the last class meeting to draw up a constitution to replace the one destroyed by fire in Richmond, Va., have met and drafted a constitution to be submitted to the class at the next regular meeting.— William H. McAlpine, until recently on the engineering force at Portsmouth, N.H., Navy Yard, is to be transferred to Cincinnati, and to work in connection with the army engineer corps.— Frank S. V. Sias made a brave effort to rescue Mr. George L. Bullens, of Melrose, who was drowned at Nahant, July 29. Mr. Sias held him up until a boat from the shore could reach them, and was utterly prostrated by the effort, which, however, was vain.

### 1897.

JOHN A. COLLINS, JR., *Sec.*, 79 Tremont Street, Lawrence, Mass.

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Warren H. Barnes, employed by the Chicago & North-western R.R., has, throughout the spring and summer, been in charge of a

large number of men in Western Wisconsin, with headquarters at Baraboo. At noon one day he received a telegram from the superintendent at Chicago to report as soon as possible. He packed at once, and took the night train for Chicago, reaching there at noon the next day. Had an interview with the construction manager, and received orders to take the division at Huron, So. Dak., seven hundred miles away, as roadmaster. It is a very substantial advance, and he will have entire charge of a whole section. — A few days since the secretary received a letter from Edwin P. Osgood, who is in Bangkok, Siam. He is there on a three years' contract as an engineer in the Royal Sanitary Department. Fortunately, he is married, and had his wife with him; so he will not feel completely isolated from the world. — Cards have been received announcing the birth to Mr. and Mrs. Robert S. Lunt, on Aug. 19, 1902, of Robert S. Lunt, Jr. '97 is making a very creditable showing as regards the next generation. — Charles L. Hammond was married on April 26 to Miss Florence Edith Thomas. Hammond is doing engineering work at Fort Dale, Fla.

## 1898.

C.-E. A. Winslow, *Sec.*, Hotel Oxford, Boston, Mass.

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Arthur A. Blanchard has returned from a year's study at Leipzig to take an instructorship in chemistry at the New Hampshire College, Durham, N. H. — Edwin Kuttroff is now with the Verona Chemical Company of Newark, N.J. — Henry P. Richmond and Miss Nellie Sophila, daughter of Mr. J. T. Wilson, were married at the Independent Church, Nahant, on October 14 last, and will be at home on Wednesdays after December 15, at 41 Commonwealth Avenue, Newton Centre. — LeRoy H. Byam has been transferred from Peekskill to Buffalo, where he is acting as assistant division engineer of the Western Division of the New York Central Railroad. — Samuel A. Neidich, president of the Neidich Process Company, may be addressed at 1038 Ridge Avenue, Philadelphia. — I. M. Chase, Jr., who is in the Pennsylvania Division of the New York Central, has recently announced his engagement to Miss Lucy Ellis, of Fairhaven. — A. J. Fearing and L. D. Peavey are

now with Purdy & Henderson, civil engineers, in the Paddock Building, Tremont Street, Boston.— F. S. Tucker has moved from Trenton to Newark, N.J., where he is assistant mechanical superintendent for the Clark Thread Company.— G. R. Wadsworth is now designing engineer for the New York Central Railroad at the New York office.— George McM. Godley has become connected with the Warren Foundry and Machine Company at 160 Broadway, New York City.—William G. Smith is engaged in inspecting work on the new Western Aqueduct for the Metropolitan Water Board. — John E. Warren is in the Albany Building, Boston, with French & Hubbard, consulting engineers.— Fred H. Twombly has been made treasurer and manager of the Geller Self-controlling Check System Company. He added somewhat to his income at a small poker party given by L. D. Gardner near the end of September.— Joseph G. Coffin, who is still pursuing his studies at Clark University, has been appointed instructor in physics in the collegiate department of that institution.— Alpheus A. Packard is at Bristol, R.I., and is now superintendent of the Herreshoff Manufacturing Company Shops at that place.— H. B. Collins is very active in the mining operations of Leadville, being general manager of the Big-Evans, the Empire Gulch, and the Reno Mining Companies, and of the Arnold Leasing and Mining Company.— Miss S. Usher is an instructor in the new Simmons College for Women, opened this winter in Boston.— No. 5, Vol. XII., of the Memoirs of the American Academy of Arts and Sciences, is an account of "Experiments on the Effect of Freezing and Other Low Temperatures upon the Viability of the Bacillus of Typhoid Fever," and of "Statistical Studies on the Seasonal Prevalence of Typhoid Fever in Various Countries, and its Relation to Seasonal Temperature," by Professor W. T. Sedgwick and C.-E. A. Winslow.— William S. B. Dana, who was in W. W. Ward's office, is now practising as an architect at 150 Fifth Avenue, New York.— James E. Hazeltine has been made treasurer of the Bashlin Company, Warren, Pa., with which concern he was connected as superintendent last year.— H. K. Conklin was married to Miss Alice Florence Munsick on April 16 at Newark, N.J. Mr. and Mrs. Conklin are now residing at 70

Heller Parkway, Newark, N.J.— G. A. Hutchinson writes as follows from Anaconda, Mont.: "I got a note from Don Campbell the other day. It seems he has removed to Butte, though still with the Rand Drill Company. As soon as he can spare a little time, we intend to get together, as we are only twenty-six miles apart. This is a fine summer climate, cool and comfortable all the time; and, in fact, we can get into a snow-bank any day by going up into the mountains a few miles. For a summer resort some of these Rocky Mountain points would knock the White Mountains galley west if properly advertised and made attractive.

"Remember me to my friends. I am counting on seeing you all once more next spring." . . .

1899.

WALTER O. ADAMS, *Sec.*, 1776 Massachusetts Avenue, North Cambridge, Mass.

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The marriage is announced of Albert F. Nathan, Jr., to Margaretta Hollins at Danville, Ky.— News comes from Miles Sherrill that he is now studying under Abegg at Breslau, having discontinued his work with Ostwald. Miles is now recovering very fast from his recent ill-health.— Burt Rickards has lately published in the *Journal of Applied Microscopy and Laboratory Methods* a very efficient and complete system for recording culture of bacteria genealogically for laboratory purposes. The marriage of Mr. Rickards to Miss Alma Leighton, of Melrose, will take place on Tuesday evening, October 28.

1900.

GEORGE EDMOND RUSSELL, *Sec.*, 25 Broad Street, New York, N.Y.

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Little or no news has come from the men during the vacation months, although a letter now and then comes from some distant member. A few weeks since, Thomas D. Perry wrote from Grand Rapids, Mich., where he has gone to join the Fred Macey Company. Ever since graduating Perry has been connected with the Library Bureau in Boston; and, although his Boston friends will

hear of his advancement with pleasure, it will be regretted that they must lose from their number such an enthusiastic and valuable alumnus.— Walter C. Dean is at the Norfolk, Va., Navy Yard, in charge of the electrical station there. His recent engagement to Miss Katheryn Brundage, of Factoryville, Pa., has just been announced. In June, Dean was elected a member of the American Institute of Electrical Engineers.— The engagement has been announced of Philip R. French to Miss Clara Belle Soule, of Somerville, Mass.— Mr. Russell Parker Priest, of Malden, was married September 17 to Miss Inez Noah.

## 1901.

ALBERT W. HIGGINS, *Sec.*, Saylesville, R.I.

During the summer months hardly any news has been received from members of the class. However it is to be hoped that the class spirit has not lessened, and that this fall and winter we may again enjoy some pleasant evenings at the Technology Club. Plans are already under way for a reunion some time in November, and certainly every member of the class living in the immediate vicinity of Boston should make a determined effort to make the affair a success by attending.— Newlin is to be Walker instructor in mathematics at Amherst College this year.— Allan W. Rowe will be Professor Atwater's assistant at Wesleyan University.— N. L. Danforth expects to enter his father's business in Buffalo soon.— E. F. Lawrence is with Stephen Codman, Beacon Street, Boston.— C. A. Record has been abroad this summer, but will return to the General Electric Company, Lynn, soon.

## 1902.

CHARLES W. KELLOGG, Jr., *Sec.*, 51 St. Paul Street, Brookline, Mass.

Francis D. Avery is transitman for the city of Gloucester; his address is 28 Western Avenue, Gloucester, Mass.— Howard Baetjer is with the American Bridge Company at Pencoyd, Pa.

His address is 122 Rochelle Avenue, Wissahickon, Pa.— Edith A. Beckler is teaching in the Berlin High School, Berlin, N.H. — Norman E. Borden is with the Draper Company at Hopedale, Mass.— Harry B. Canby's address is 51 Belmont Avenue, Dayton, Ohio. — Bernard W. Capen is in the Engineering Department of the American Telephone and Telegraph Company, 125 Milk Street.— Louis S. Cates is at present with the National Steel and Wire Company of New Haven, Conn. — H. M. Chapman is at Sydney, Cape Breton, Canada, with the Dominion Iron and Steel Company.— A. R. Childs is employed as draughtsman by the New England Granite Works of Westerly, R.I. Home address, Lee, Mass.— Arthur L. Collier's address is 91 Congress Avenue, Chelsea, Mass.— William A. Durgin is with Messrs. Stone & Webster, electrical experts and engineers, 93 Federal Street, Boston. His home address is 16 Lesley Avenue, Somerville.— Robert Seaver Edwards is with the Rockland and Rockport Lime Company of Rockland, Me.— Henry A. Ferrin's address is 1515 Middlesex Street, Lowell, Mass.— Alfred W. Friend is with the Simplex Electrical Company, Cambridgeport, Mass. Home address, Manchester, Mass.— B. W. B. Greene is at Hda Quvesa, Oguirre, Central Porto Rico.— Lester C. Hammond is instrument-man on the N.Y. C. & H. R. R.R., Maintenance of Way Department. His address is 148 Morgan Street, Buffalo, N.Y.— Elmer Merrill Hervey is in the Testing Department of the General Electric Company at Schenectady, N.Y. Address, 233 Liberty Street Schenectady, N.Y. — F. H. Hunter was architectural draughtsman with Parker & Thomas, 1 Somerset Street, during the summer, returning to the Institute as a Fellow in October. Address, 94 Perham Street, West Roxbury, Mass.— Charles W. Kellogg, Jr., is a graduate student at the Institute.— P. E. Kimball is a student at Tufts College.— Albert Eaton Lombard is with Messrs. Buerkel & Co., Boston. Address, 215 Newbury Street, Boston.— Thomas F. McDonnell is a member of the firm of McDonnell & Sons, granite manufacturers and quarry owners. His address is Hotel Greenleaf, Quincy, Mass.— E. B. MacNaughton is in the office of Frank B. Gilbreth, general contractor. Address, 3 Mt.

Auburn Street, Cambridge, Mass.— Frank H. Mason, of East Lexington, Mass., is a civil engineer with George S. Rice and George E. Evans, Boston and New York.— Robert Mayo, Jr., is with the master mechanic at the Midland Works of the American Sheet Steel Company. His address is 315 Adams Street, Muncie, Ind.— Clyde R. Place is inspector for the Travellers' Insurance Company at Hartford, Conn.— Frank H. Reed is in the Department of General Construction of the New England Telegraph and Telephone Company at 101 Milk Street, Boston.— J. R. Scott's address is "The Firs," Fallowfield, Manchester, England. — Carl F. Setz, Herculaneum, Mo.— Charles L. Shed is with Purdy & Henderson, civil engineers at 101 Tremont Street, Boston, Mass. Address, 9 Sargent Avenue, Somerville.—Arthur E. Swan's address is 25 Waban Street, Roxbury.— Grant S. Taylor's address is Newport, R.I.— James L. Taylor, Jr., is in the Department of Maintenance of Way, Pennsylvania Lines West of Pittsburg (Eastern Division).— Howard C. Turner's address is Arlington, Mass.— Paul Weeks is with the Baldwin Locomotive Works; and his address is 1524 Swain Street, Philadelphia, Pa.— The address of Irving Williams is 77 Arlington Avenue, Providence, R.I.— Robert T. Williams is at the Institute as an assistant. Home address, 204 No. Blackstone Street, Jackson, Mich.— Kent T. Stow was married on July 23 to Miss Pauline Douglas Brown. Address, 50 Richmond Avenue, Buffalo, N.Y.— The Walker Memorial Subscription Fund from the class is now about $470. This is very small compared with the subscriptions of previous classes, especially since all the facts and figures of the case were submitted to the class in a circular sent out last June in connection with circulars requesting information regarding address, occupation, etc. It is hoped that there may be a different story to tell when the next issue of the REVIEW is published.—The officers of the class are: president, C. A. Sawyer, Jr.; first vice-president, Louis S. Cates; second vice-president, R. V. Brown; secretary and treasurer, C. W. Kellogg, Jr.; assistant secretary, L. W. Millar.—Charles Fox Knights died of consumption on June 1, 1902.

# NECROLOGY

## WILLIAM D. GELETTE, '69

William D. Gelette, for many years chief assistant engineer of the Southern Pacific Company, died of heart failure at his home in Oakland, Cal., on April 27 of the present year. He was born in Fairhaven, Mass., fifty-five years ago, and received his education at the Massachusetts Institute of Technology, being a member of the class of 1869. On leaving the Institute, he entered the office of Mr. Clemens Hershel, one of the leading engineers of Boston. Coming to California in 1875, Mr. Gelette at once entered the employ of the Southern Pacific Company, advancing rapidly until he became chief assistant engineer, which position he held up to the time of his death. He was engineer in charge of construction through Southern California, Arizona, New Mexico, and to its eastern connection in Texas, and was also head of construction during the building of the Shasta route. This work often called for the display of the highest executive and constructive knowledge, which was on every occasion exercised with great credit to his ability and the approval of his company. He was taken ill at El Paso, whither he had gone on business for the company; but his conscientious devotion to the interests of his employers kept him at his post until the work he had undertaken was completed, when his strength barely permitted him to make the return trip home, where he quietly breathed his last a few days later. He was for many years a prominent member of the American Society of Civil Engineers, in whose transactions he always took the greatest interest. Mr. Gelette was married in Boston in 1871, and left, besides his wife, a married daughter, Mrs. Mabel G. Vane, and a son, William S. Gelette.

## JOHN M. KIMBALL, '85

John M. Kimball, one of the best-known life underwriters in New England, died suddenly at his residence, 973 Centre Street, Newton Centre, Sunday night, Aug. 17, 1902.

He was born in Bath, Me., Nov. 14, 1863. After having received a liberal public school education, he came to Boston to study mechanical engineering at the Massachusetts Institute of Technology. After a four years' course there he was connected with the Bates Manufacturing Company at Lewiston, then with the Tremont and Suffolk Mills at Lowell as superintendent. Afterward he was superintendent of the Westbrook Mills at Westbrook, Me., till 1893, when he was appointed agent of the Slatersville Mill at Slatersville, R.I. In 1895 he was made treasurer of the mills, with his office in Providence. In 1897 he went into the Equitable Life Assurance Society, and after a few months' service was promoted to a general agency of his own with a special field. Besides being a heavy underwriter himself, he showed marked executive ability in surrounding himself with capable assistants. His business became not only the largest with the Equitable in New England, but he soon ranked as one of the principal contributors throughout the country.

In January, 1901, he joined Mr. C. E. Townsend, establishing the firm of Kimball & Townsend, a partnership abruptly terminated by Mr. Kimball's untimely death.

Mr. Kimball, in common with most successful life insurance men, enjoyed an extremely wide acquaintance, which extended over the whole of New England. He imparted to the business of insurance a natural dignity, and was extremely jealous of the traditions of the profession.

Mr. Kimball enjoyed the confidence of his fellow-underwriters to an unusual extent. He was vice-president of the Boston Life Underwriters' Association, and without doubt would have been the successor of the present president at the annual election. He was a familiar figure at all the banquets given by the Association.

Mr. Kimball was prominent in Republican circles, and was a member of the Board of Aldermen of Newton at the time of his death. He was a member of the Boston Athletic Association, and was a thirty-second degree Mason.

In 1893, Mr. Kimball married Sally B. Small, of Portland, Me., who, with two daughters and a son, survives him.

DENZIL HOLLIS TAYLOR, '99

"The sad and unexpected intelligence was received here late Friday afternoon of the death, August 14, of Denzil H. Taylor, son of Edwin H. Taylor, of this town. The news came by telegram from Washington, being cabled from the Philippine Islands, where he has been since August, 1901, occupying a government position. The despatch gave but meagre information except that death occurred from the prevailing disease, cholera, and in Laoag, the capital of the Province of Ilocos Norte, in the northern part of Luzon.

"He was born in Parsons, Kan., twenty-five years ago, and, when four years of age, came to Peterboro. At fifteen years of age he entered the Sophomore Class of Cushing Academy, and at his graduation entered the Massachusetts Institute of Technology, from which he graduated as a civil engineer in the class of 1899. He immediately took up the work of his profession by entering the employ of the Continental Filter Company of New York City as a draftsman. . . .

"In June, 1901, he accepted the office of provincial supervisor in the Philippines. He sailed from San Francisco July 10, and reached Manila toward the last of August. He was assigned to the province of Ilocos Norte in the north-west part of Luzon.

"The office of provincial supervisor gave control to and direction of all the engineering problems of the province. Upon reaching his post, he found that in addition to these duties he was to have a position on the provincial board, consisting of three officials who, under the direction of the insular commission at Manila, were the rulers of the province.

"He entered upon the duties of this important office with his characteristic energy, and soon found that a system had grown up which was making the poorer people slaves. . . . He found this system thoroughly established, and that to break it up would require a bitter fight with the most influential people of the province. A weakling would have flinched from the conflict: a corrupt man would have used the opportunity for his own advantage. It is the crowning glory of Denzil Taylor's short life that he neither shrank from this

fight for poor humanity nor listened to the voice of the tempter. Often in his earlier letters he referred to this system of oppression, generally ending with some stern expression of determination or sympathy, as, 'This is slavery, the thing must go.' Again: 'These people have been terribly ground down, and it is hard for them even now to realize that we mean to treat them differently.'

"At last, with the aid of another brave young American, John N. Currier, treasurer of the province, even against the strong opposition of the Filipino governor, the victory was won; and an act was passed forbidding enforced and unpaid labor, and giving the people the right to bring their produce into the open market and sell it at its fair value.

"In his later letters he occasionally refers in a casual way to the effect of the new order of things, as, 'The people are slowly beginning to realize that we are trying to treat them justly, and to thank us for it.' Again, 'The poor people often come to me and express their gratitude, and confide in me as they do not in others.' . . ." *Peterboro (N.H.) Transcript.*

# BOOK REVIEWS

## AMERICAN GARDENS

By Guy Lowell. Published by Bates & Guild, Boston.

This quarto published by Bates & Guild is the most striking and attractive volume on gardening that has been issued this year. The first impression on turning over the more than one hundred pages of illustrations is one of astonishment that all the gardens here illustrated are really American gardens. One can hardly resist the thought that England, France, and Italy have all been drawn upon to furnish these beautiful views.

The letterpress occupies but a very small portion of the whole volume. It gives, however, a most satisfactory sketch of the growth and characteristics of gardens in European countries, and then very clearly and appreciatively points out the original lines along which American gardens can be most suitably developed. Mr. Lowell is not a one-sided advocate of either formal or natural gardening, but sees the good points in each, and emphasizes the importance of adapting the treatment to each particular case. No matter what one's preconceived notions may be with reference to formal or natural treatment of the grounds, one cannot but be convinced after reading these pages that Mr. Lowell is most trustworthy and catholic in his tastes and is a thorough master of his subject. The half-tone illustrations are the finest examples of this work that have ever been produced, and include views of nearly every type of American garden, from the picturesque little nooks and corners about Salem to the magnificent Italian-like vistas of the terraced slopes and palatial gardens of Pennsylvania, New York, and New Jersey.

There are very charming glimpses given of old colonial gardens, such as the governor's garden at Milton, Washington's at Mount Vernon, and the Old Carroll Garden of Annapolis, Md. Some extracts from Mr. Lowell's book may show something of his method of presenting the subject: —

"It is a mistake to say that one type of garden, either the formal or the natural, can be correct, satisfactory, or beautiful. Each represents a style perfect in itself, yet totally different. There is no need of condemning one in favor of the other, each is appropriate in its place. It is the appropriate adaptation of the established European principles of gardening to American surroundings that will perfect an American style."

"We may borrow then details and ideas from Italy, France, and England, but we must adapt them skilfully to our needs and give them the setting which they require. Our garden need not, when adapted to this country, follow any recognized style. To keep a garden in scale is one of the most difficult problems with which a designer has to contend. The character of the surrounding landscape, whether part of the same estate as the garden or not, has much to do with the scale, and the size of the building near which it is to be laid out has even more. The garden at Versailles laid out beside a New England farm-house would be as inappropriate as a Salem garden adjoining the Vatican."

What Mr. Lowell says about the use of color and the necessity for skilful planting with reference to the blooms and foliage of the different seasons is especially true and interesting.

Many of the points which are made in regard to harmony of colors and the adaptation to the general landscape can scarcely be illustrated by photographs, but all the other points brought out in the text are most fully set forth by the profuse and well-selected pictures.

A. E. B.